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ABSTRACT

The Student Achievement Guarantee in Education (SAGE) is a statewide effort in Wisconsin to increase the academic achievement of children living in poverty by reducing the student-teacher ratio in kindergarten through third grade to 15:1. Schools participating in SAGE are also required to implement a rigorous curriculum, provide before- and after-school activities, and implement professional development plans. In 1998-1999, the SAGE evaluation considered 131 kindergarten, 143 first-grade, 143 second-grade, and 139 third-grade classrooms enrolling 2,303 kindergartners, 2,508 first graders, 2,493 second graders, and 2,572 third graders. Academic achievement was measured through achievement tests administered in grades 1, 2, and 3, and case studies were conducted in three SAGE schools. As had been found in 1997-1998, test scores of SAGE and comparison schools for first graders showed statistically higher performance of SAGE students in language arts, mathematics, and total scores. African American students made significantly higher gains through the school year, closing the achievement gap. Results for grades 2 and 3 generally followed the same pattern. Case studies, observations, and teacher and principal questionnaire responses all supported the positive effects of the SAGE program on classroom environment. All SAGE schools were implementing more rigorous curricula, staff development, and the "lighted schoolhouse" activities of before- and after-school programs. (Contains 58 tables and 11 references.) (SLD)

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1998-99 EVALUATION RESULTS OF THE STUDENT ACHIEVEMENT GUARANTEE IN EDUCATION (SAGE) PROGRAM

ED 441 003

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INTRODUCTION

SAGE Program

The Student Achievement Guarantee in Education (SAGE) evaluation is being conducted under contract with the Department of Public Instruction by the School of Education at the University of Wisconsin–Milwaukee. The purpose of the SAGE evaluation is to determine the effectiveness of the Student Achievement Guarantee in Education (SAGE) program in promoting academic achievement of students in kindergarten through third grade classrooms in schools serving low-income children.

The 1995 SAGE statute [s. 118.43] requires participating schools to (1) reduce class size to 15 in kindergarten and grade one in 1996–97, grades kindergarten through two in 1997–98, and grades kindergarten through three in 1998–99 to 2000–2001; (2) stay open from early in the morning to late in the day and collaborate with community organizations to provide educational, recreational, community, and social services (i.e., the "lighted schoolhouse"); (3) provide a rigorous academic curriculum to improve academic achievement; and (4) establish staff development and accountability mechanisms.

The SAGE evaluation involves the 30 schools in 21 school districts that launched the SAGE program in 1996-97 in kindergarten and first grade. Second grade was added in 1997-98, and third grade in 1998-99. The SAGE evaluation compares SAGE schools to a group of 14-17 non-SAGE Comparison schools located in SAGE districts. The results of the 1996-97, 1997-98 and 1998-99 evaluations are generally consistent with Tennessee's Student Teacher Achievement Ratio (STAR) Project (1985-1989), the largest and best-controlled study on class size reduction to this point. It is worth noting two significant design differences in the Tennessee and SAGE studies. First, the Tennessee STAR Project used a true experimental design. The SAGE project uses a quasi-experimental design. The SAGE project evaluation uses naturally occurring classrooms while STAR employed random assignment of students to classroom types which were held constant for the duration of the study. Second, the SAGE evaluation uses a control or comparison group for the purpose of assessing the impact of SAGE interventions.

Goals of SAGE Evaluation

The SAGE evaluation is intended to determine the impact that the four interventions of the SAGE program have on student achievement. To ascertain and to explain this impact, the evaluation addresses the following questions:

SAGE vs. Comparison School – Achievement Outcome Questions

1. What are the achievement levels of SAGE classrooms compared to achievement levels of classrooms in selected Comparison schools?
2. Does participation in a SAGE classroom have a differential impact on the achievement of minority students and white students?
3. Does the impact on achievement of participation in a SAGE classroom change from year to year as students progress from first through third grade?
4. Is the socio-economic status (as measured by participation in the school lunch program) of SAGE participants related to individual achievement gains in first through third grade?
5. Do different types of SAGE classrooms (e.g. one teacher with 15 students vs. two teachers with 30 students) have different impacts on student achievement?

SAGE Schools – Classroom and School Questions

1. What are the instructional characteristics of SAGE classrooms?
2. How are SAGE classrooms organized?
3. Does the degree of congruence between SAGE classroom curricula and national professional curriculum standards in reading/language arts and mathematics correlate with the achievement levels in SAGE classrooms?
4. Does participation in the SAGE program result in an increase in the number or change in the type of school and/or community activities housed in the school before and after school hours?
5. What is the structure and focus of professional development activities in SAGE schools?
6. Does the number of years of teaching experience of SAGE teachers correlate with student achievement?

Class Size Research Background

The principal SAGE intervention is a reduction in class size to 15:1 in kindergarten through third-grade classrooms. Class size reduction in the early elementary grades has become an increasingly popular issue for policymakers and researchers in recent years (Grissmer, 1999; U. S. Department of Education and the Laboratory for Student Success, 1999). Class size reduction has been credited with more learning opportunities for students, increased opportunities for teachers to meet children's individual needs, and less time spent on discipline problems. Parents and teachers like the idea and policymakers are embracing it. Several states, among them California, Florida, Indiana, Nevada, Tennessee, and Wisconsin have launched class size reduction efforts (Pardini, 1998; Viadero, 1998).

Decades of research on class size reduction have shown small achievement gains for students when, for example, class size was reduced from 25 to 20 students. In general, though, reductions of just a few students per class do not seem to significantly raise academic achievement. However, in the late seventies, an analysis by Glass suggested that larger reductions produced greater achievement gains (Glass, 1978; Pate-Bain, Achilles, Boyd-Zaharias, & McKenna, 1992).

A statewide experiment in Tennessee, the largest and best-controlled study on class size reduction to this point, assigned kindergarten students on a random basis to classes of 15, 25 with a teacher and an aide, or 25 with a teacher. The same configurations were maintained through third grade. Tennessee's Project STAR (Student/Teacher Achievement Ratio) analyzed student achievement in relation to class size over a four-year period (1985-1989). The project included 17 inner-city, 16 suburban, 8 urban, and 39 rural schools. Findings showed that students in the smaller classes scored higher on the Stanford Achievement Test and on the Basic Skills First (BSF) Test in all four years (K-3) and in all locations. The greatest gains on the Stanford Test were made by inner-city small classes. While all students benefited, disadvantaged minority students seemed to benefit more from smaller class sizes than their peers (Pate-Bain, Achilles, Boyd-Zaharias, & McKenna, 1992).

Studies such as STAR and SAGE can provide crucial information for policymakers. For example, a review of the research literature conducted by Bingham (1993) on white-minority achievement gap reduction and small class size, which included the STAR Project, suggests that small class sizes in the early grades represent an effective strategy to reduce the achievement gap. Bingham proposes that class size reduction may offer an early intervention strategy that serves to prevent rather than to reduce the achievement gap

between white and minority students. Wenglinsky (1997) studied the relationship between spending and student achievement by analyzing data from three separate sources: The National Assessment of Educational Progress, the Common Core of Data, and the Teacher's Cost Index of the National Center for Education Statistics. Wenglinsky's research suggests that increased spending to reduce class size has a direct positive effect on mathematics achievement for fourth grade students. Further support for small classes in lower elementary grades is produced by the Lasting Benefits Study (LBS). The LBS tracked students who participated in Project STAR in order to determine whether achievement advantages of students from small classes were maintained after students returned to regular-sized classes in fourth grade. Data from 1990-1994 indicate that students who were originally in smaller classes continued to perform better than their peers from classes of 25 with or without a teacher's aide (Mosteller, 1995).

Grissmer (1999) notes that ultimately our confidence in measurements of small class size effects will arise from knowledge of the specific processes inside classrooms. Class size effects are better understood if we can discern the processes used in these classrooms that affect student development and achievement. Grissmer advises researchers to address fundamental questions about the nature of evidence in small class size studies. For policy decisions, he notes that "the seeming transparency of experimental data to policymakers should not be the deciding factor in their policy judgments" (p. 93). Grissmer further observes that having both experimental and non-experimental evidence is rare in the educational research community. The SAGE evaluation project includes both experimental and non-experimental data. Since its inception, the design of the SAGE evaluation project has called for data from student tests and processes in SAGE classrooms. Analyzing processes inside small classrooms with regard to teacher and student behavior have been a crucial part of the SAGE evaluation project and are reported in the evaluation results along with student achievement data.

Grissmer (1999), from an analysis of small class size research, concludes that a key contribution of experimental data can be their guiding role in non-experimental studies to develop a theory of classroom teacher and student behavior that explains higher student achievement. In Wisconsin, the SAGE evaluation team has already incorporated this recommendation in its research on class size effects.

Summary of 1996-97 and 1997-98 Findings

Achievement Outcome Findings 1996-97 and 1997-98

To measure academic achievement, first grade students in SAGE schools and in a group of Comparison schools were tested in October 1996, and again in May 1997, using the Comprehensive Test of Basic Skills (CTBS) Complete Battery, Terra Nova edition, Level 10. After one year, students in SAGE first grade classrooms scored higher on CTBS tests than first grade students in Comparison schools. As a group, SAGE students scored significantly higher on the post-test in reading, language arts, and mathematics sub-tests of the CTBS. The total score of SAGE students was also significantly higher than the total score of comparison group students. The achievement advantage associated with participation in the SAGE program was revealed both in the analysis of individual student scores and in the analysis of averaged classroom scores.

At the individual level of analysis, after controlling for pre-test scores, income, absenteeism, and race and ethnicity, SAGE first grade students scored higher than Comparison school first grade students on the CTBS post-test in reading, language arts, mathematics and total score. The results were statistically significant for all but the reading scores. At the classroom level, the post-test performance of SAGE first grade students was 4 scale score points higher in language arts, 4.3 scale score points higher in reading, 4.6 scale score points higher in mathematics, and 4.6 scale score points higher in the total test score than Comparison school students. Each of these findings was statistically significant.

After adjusting for individual pre-test results, socioeconomic status (SES) as defined by eligibility for subsidized lunch, and student attendance, participation in SAGE shows a statistically significant advantage of 6.4 scale score points in the total score and 8.1 scale score points on the mathematics sub-test.

The classroom level data on the averaged performance of students in 1996-97 and 1997-98 SAGE classrooms suggested that the lower student-teacher ratio in SAGE classrooms mitigated the negative achievement consequences of poverty. SAGE classrooms achieved at a higher level than Comparison school classrooms despite the fact that, as a group, SAGE classrooms enrolled more students who were eligible for subsidized lunch. Furthermore, after adjusting for individual pre-test results and SES as defined by lunch status and student attendance, the post-test scale score advantage increased to 9.8 for SAGE first grade classrooms. The advantage was 7.1 on the reading sub-test, 9.0 on the language arts sub-test, and 12.3 on the mathematics sub-test. These results were all statistically significant.

Second grade classrooms were looked at in 1997-98, and results were similar to those found for 1996-97 first graders. The 1997-98 results suggest that the positive effects of the SAGE program are maintained, but not increased in second grade.

School and Classroom Findings 1996-97 and 1997-98

To more fully understand the SAGE program, it is important to understand how SAGE schools structured classrooms and implemented a reduced student-teacher ratio, rigorous curriculum, staff development, and lighted schoolhouse. Together, that information provides a within-SAGE school and classroom data description of life in SAGE classrooms and schools.

Classroom Level Findings

Data from 1996-97 and 1997-98 suggested that the main change that results from having a reduced size class is individualization. Teachers focus on individual learning needs through one-to-one, small groups, and total class teaching. This focus on individuals was brought about by knowing students better, having more time for teaching because of reduced need for discipline, and being more enthusiastic about teaching , all which result from having fewer students.

The type of instruction that students encountered in SAGE classrooms was predominantly teacher centered. Listening, practicing, receiving help, and answering accounted for the main portion of the teaching-learning that occurred. Although teachers indicated that more student-centered activities such as creating, manipulating, and problem solving increased somewhat because of reduced class size, student-centered teaching played only a supplemental role in most SAGE classrooms.

In regard to teaching and learning among the four main types of SAGE classes and between grades one and two, few differences were observed.

School Level Findings 1996-97 and 1997-98

The Teacher Questionnaire and Principal Interviews, both completed in May 1997 and May 1998, were the sources of data regarding *rigorous curriculum* implementation. The Teacher Questionnaire contained a section on classroom curriculum designed to determine the congruence of SAGE classroom curricula with professional curriculum standards. First grade and second grade teacher responses indicated that their reading/language arts curriculum and mathematics curriculum were quite congruent with professional standards. Principal responses to curriculum-related questions suggested that a rigorous curriculum

included basic skills, problem solving, and higher-level thinking. Only a few principals seemed to believe that the curriculum of their school was rigorous in total. However, most SAGE principals regarded parts of their curriculum as strong. A section of the Teacher Questionnaire contained *staff development* questions. Teachers were asked about their individual level of professional development as well as the extent to which their school district provided staff development programs. About 60 percent indicated that they had a written development plan and it was determined by the teachers themselves. Data regarding implementation of *lighted schoolhouse* activities for 1996-97 and 1997-98 were obtained from the Principal Interviews and year-end reports required by DPI. Principal Interview data suggested that SAGE-schools took responsibility for the conception and operation of the lighted schoolhouse activities and that the number of lighthouse activities and number of participants in the activities has progressively increased.

1998-99 SAGE EVALUATION

Descriptions and Definitions

Schools

During 1998–99, the SAGE program was continued in 30 schools located in 21 school districts throughout the state, as shown in Table 1. In addition, the SAGE evaluation consisted of 17 Comparison schools located in 11 SAGE school districts.

Table 1. SAGE Schools 1998-99

SAGE DISTRICTS AND SCHOOLS	
DISTRICT School	**DISTRICT** School
ADAMS-FRIENDSHIP AREA Adams Elementary	**MENOMONEE INDIAN** Keshena Primary
BELOIT Robinson Elementary	**MENOMONEE AREA** River Heights Elementary
CUDAHY Parkview Elementary	**MILWAUKEE PUBLIC SCHOOLS** Carleton Elementary
GILMAN Gilman Elementary	Fairview Elementary
GLIDDEN Glidden Elementary	Longfellow Elementary
GREEN BAY AREA Jefferson Elementary	Maple Tree Elementary Maryland Avenue Elementary Sherman Elementary Wisconsin Conservatory

JANESVILLE	**PRENTICE**
Wilson Elementary	Ogema Elementary
	Tripoli Elementary
KENOSHA	**SIREN**
Durkee Elementary	Siren Elementary
LAC DU FLAMBEAU #1	**SOUTH SHORE**
Lac Du Flambeau Elementary	South Shore Elementary
LACROSSE	**SUPERIOR**
Franklin Elementary	Blaine Elementary
Hamilton Elementary	Cooper Elementary
LAONA	**SURING**
Robinson Elementary	Mountain Elementary
MADISON METROPOLITAN	**WEBSTER**
Glendale Elementary	Webster Elementary

Students

In 1998-99, the SAGE evaluation involved 9,876 active students in kindergarten (2,303), first grade (2,508), second grade (2,493), and third grade (2,572). The characteristics of students in SAGE and Comparison schools are displayed in Table 2.

Table 2. Characteristics of SAGE and Comparison Students 1996-97, 1997-98 and 1998-99

Characteristic	Percent of Students SAGE			Percent of Students Comparison		
	96-97	97-98	**98-99**	96-97	97-98	**98-99**
Gender						
Female	48.6	48.4	48.6	49.4	48.5	48.7
Male	51.4	51.6	51.4	50.6	51.5	51.3
Race/Ethnicity						
African American	24.8	26.3	22.4	32.9	24.7	19.7
Asian	5.7	5.2	4.8	5.5	5.6	5.9
Hispanic	6.6	6.5	6.4	8.0	10.0	9.5
Native American	11.7	10.3	10.9	1.4	1.5	1.5
White	48.8	43.8	44.2	49.0	52.2	53.4
Other	1.6	2.0	1.8	2.7	2.3	2.3
Subsidized Lunch Eligibility						
Free	57.7	54.0	52.7	49.4	43.4	40.7
Reduced	10.9	10.6	11.5	9.9	8.9	10.4
Not Eligible	31.4	35.4	35.8	40.7	47.7	48.8
Repeating Grade	3.2	2.7	2.0	2.6	2.0	1.5
English as Second Language	8.2	7.9	7.5	4.9	6.4	6.7
Referred to M-Team	13.6	9.6	12.7	9.2	6.8	9.1
Exceptional Education Need	13.1	10.0	12.7	9.7	7.1	1.3

During the course of the 1998-99 school year, records were compiled on 9,876 students. Many students withdrew from SAGE and Comparison schools during the year, while others enrolled. Those students who remained in their schools for the entire year are labeled "persisters". The number of students in SAGE and Comparison schools by grade and school year can be seen in Table 3.

Table 3. Number of Students in SAGE and Comparison Schools by Grade and School Year

	SAGE			COMPARISON		
	1996-97	1997-98	1998-99	1996-97	1997-98	1998-99
Kindergarten	1494	1524	1416	820	676	887
First Grade	1723	1567	1525	1001	985	983
Second Grade	NA	1541	1446	NA	868	1047
Third grade	NA	NA	1531	NA	NA	1041
Totals	3217	4632	5918	1821	2529	3958

As Table 4 shows, the stability of student enrollment is not clear. Although the percentage of ongoing SAGE students was higher than ongoing Comparison students and the percentage of SAGE students withdrawing was lower than Comparison students, the percentage of Comparison students enrolled was considerably higher than SAGE students.

Table 4. Enrollment Changes in SAGE and Comparison Schools by School Year (Percentage of Students)

	SAGE			COMPARISON		
	1996-97	1997-98	1998-99	1996-97	1997-98	1998-99
Ongoing	81.4	42.3	44.8	85.3	44.3	39.1
Withdrew	11.0	18.8	27.5	8.9	18.6	20.2
Enrolled	7.6	39.0	27.6	5.8	37.0	40.6

Classrooms

SAGE schools reduced class size in several ways in order to meet statutory requirements. The SAGE legislation defines class size as "the number of pupils assigned to a regular classroom teacher." In practice, reduced class size has been interpreted as a 15:1 student-teacher ratio (number of students per teacher in one classroom). Implementation occurs in the following ways:

- A *Regular* classroom refers to a classroom with one teacher. Most *regular* classrooms have 15 or fewer students, but a few exceed 15.

- A *2-Teacher Team* classroom is a class where two teachers work collaboratively to teach as many as 30 students.

- A *Shared-Space* classroom is a classroom that has been fitted with a temporary wall that creates two teaching spaces, each with one teacher and about 15 students.

• A *Floating Teacher* classroom is a room consisting of one teacher and about 30 students, except during reading, language arts, and mathematics instruction when another teacher joins the class to reduce the ratio to 15:1.

Two other types of classroom organization were also utilized in the SAGE program, but to a limited extent. They are the *Split Day* classroom consisting of 15 students and two teachers, one who teaches in the morning and one who teaches in the afternoon, and the *3-Teacher Team* classroom where there are 45 students taught collaboratively by three teachers.

The types of classrooms are displayed in Table 5. SAGE classes range in number of students from 7 to 38. A few SAGE classrooms exceed the 15:1 student-teacher ratio by a few students. The teacher to student ratio for SAGE and comparison classrooms can be seen in

Table 6.

Table 5. Number of SAGE Classrooms by Type and Grade 1998-99

	Regular	2-Teacher Team	Floating Teacher	Shared Space	Split Day	3-Teacher Team	1 Full Time, 1 Part Time Teacher
Kindergarten	65	16	3	0	0	1	0
Grade 1	64	18	0	2	0	0	5
Grade 2	59	18	2	0	0	0	4
Grade 3	66	17	0	4	0	0	1
Mixed K-1	3	0	0	0	0	0	0
Mixed 1-2	2	0	0	1	0	0	0
Mixed 2-3	5	0	0	0	0	0	0

Table 6. Teacher-Student Ratio for SAGE and Comparison Classrooms 1998-99 (number of classrooms)

	SAGE Classrooms				Comparison Classrooms			
Students Per Teacher	**K**	**First Grade**	**Second Grade**	**Third Grade**	**K**	**First Grade**	**Second Grade**	**Third Grade**
7-13 Students	45	58	36	36	5	3	4	4
14-16 Students	33	32	48	48	6	6	6	4
17+ Students	8	4	6	6	34	40	43	41
Average Class Size	13.21	12.82	14.02	14.02	19.04	19.63	20.04	20.51

Data Collection Instruments

To provide information about the processes and product of the SAGE program for 1996-97, 1997-98, and 1998-99 a number of instruments were used as part of the evaluation. A description of the test and non-test instruments used in 1996-97, 1997-98, and 1998-99 follows. The data collection instruments and the plan for their use throughout the evaluation are displayed in Table 7.

1. *Comprehensive Test of Basic Skills (CTBS)* (1996-97, 1997-98, 1998-99). The Comprehensive Test of Basic Skills (CTBS) complete Battery, Terra Nova edition, Level 10, was administered to first grade students in SAGE schools and Comparison schools in October 1996 and May 1997. In 1997-98, Level 10 was administered in October and Level 11 in May to first grade students and Level 12 to second grade students. In 1998-99, Level 10 was administered in October and Level 11 in May to first grade students, Level 12 to second grade students, and Level 13 to third grade students. The purpose of the first grade October administration of the CTBS was to obtain baseline measures of achievement for SAGE schools and Comparison schools. The complete battery includes sub-tests in reading, language arts, and mathematics. The CTBS was chosen as an achievement measure because it is derived from an Item Response Theory (IRT) model that allows comparison of performance across time. Moreover, it is one of a few instruments that attempts to minimize items biased against minorities and educationally disadvantaged students. Kindergarten students were not tested because of (1) concerns over the reliability and validity of standardized test results for kindergarten-aged children and (2) the view expressed by many kindergarten teachers that standardized tests would have a traumatizing effect on their students. The effects of SAGE on kindergarten students will be determined when they are tested as first- grade students the following year.

2. *Student Profiles* (1996-97, 1997-98, 1998-99). This instrument completed in October and May, provided demographic and other data on each SAGE school and Comparison school student.

3. *Classroom Organization Profile* (1996-97, 1997-98, 1998-99). Completed in October, this instrument was used to record how SAGE schools attained a 15:1 student-teacher ratio.

4. *Principal Interviews* (1996-97, 1997-98, 1998-99). These end-of-year interviews elicited principals' descriptions and perceptions of effects of their schools' rigorous curriculum, lighted-schoolhouse activities, and staff development program, as well as an overall evaluation of the SAGE program.

5. *Teacher Questionnaire* (1996-97, 1997-98, 1998-99). Administered in May, this instrument obtained teachers' descriptions and judgments of the effects of SAGE on teaching, curriculum, family involvement, and professional development. It also was used to assess overall satisfaction with SAGE.

6. *Teacher Activity Log* (1996-97, 1997-98). This instrument required teachers to record classroom events concerning time use, grouping, content, and student learning activities for a typical day three times during the year.

7. *Student Participation Questionnaire* (1996-97, 1997-98). In both October and May, teachers used this instrument to assess each student's level of participation in classroom activities.

8. *Classroom Observations* (1996-97, 1997-98). A group of first grade, second and third grade classrooms representing the various types of 15:1 student-teacher ratios and a range of geographic areas was selected for qualitative observations to provide descriptions of classroom events.

1. *Teacher Interviews* (1996-97, 1997-98). Although in-depth teacher interviews were not part of the original SAGE evaluation design, they were added in 1997 because it became apparent that teachers had important stories to tell about their SAGE classroom experiences. The interviews deal with teachers' perceptions of the effects of SAGE on their teaching and on student learning.
2. *Principal Questionnaire* (1998-99). The Principal Questionnaire was administered to all SAGE principals in spring beginning in 1998-99. It requested them to rate and comment on teaching, rigorous curriculum, staff development, and lighted schoolhouse activities.
3. *Case Studies* (1998-99). Case studies of teaching in three schools each representing a different type of SAGE class configuration were conducted continuously throughout the school year in 1998-99. At grades one, two and three classrooms were observed in reading-language arts instruction and mathematics instruction and teachers were interviewed. Interviews with the principal and parents were also conducted.

Table 7. SAGE Data Collection by Grade Level, 1996–01

	1996–97	**1997–98**	**1998–99**	**1999-2000**	**2000-2001**
CTBS	1	1	1		
Fall, Spring		2	2, 3	2, 3	3
Spring					

Student Profiles Fall, Spring	1	1, 2	1, 2, 3	2, 3	3
Classroom Organization Profile Fall	1	1, 2	1, 2, 3	2, 3	3
Principal Interviews Spring	yes	yes	yes		
Teacher Questionnaire Spring	K, 1	K, 1, 2	K, 1, 2, 3	2, 3	3
Teacher Activity Log Fall, Winter, Spring	K, 1	K, 1, 2	discontinued		
Student Participation Questionnaire Fall, Spring	K, 1	K, 1, 2	discontinued		
Classroom Observation Fall, Spring	1 (Selected)	1, 2, (Selected)	1, 2, 3 (Selected)	2, 3 (Selected)	3 (Selected)
Teacher Interview Spring	1 (Selected)	1, 2 (Selected)	1, 2, 3 (Selected)	2, 3 (Selected)	3 (Selected)
Principal Questionnaire Spring	NA	NA	yes	yes	yes
School Case Study Continuous	NA	NA	1, 2, 3 (Selected)	2, 3 (Selected)	3 (Selected)

ANALYSES OF STUDENT ACHIEVEMENT OUTCOMES 1998-99

Methods Introduction

Statistics Utilized

The 1998-99 SAGE evaluation design utilizes descriptive statistics and multivariate inferential statistics, including linear regression and hierarchical linear modeling. Descriptive statistics, including means and standard deviations, are incorporated into this report to provide a less complicated, general analysis which the non-technical reader can use as a basis to interpret the findings. Regression analyses (at the individual level), specifically the use of ordinary least squares regression models, are employed frequently in the 1998-99 report. Regression models enable "control" variables to be entered in blocks with the variable of interest, i.e. the "SAGE/Comparison" variable entered last, thus isolating its effects from the other variables. Hierarchical linear modeling is pertinent to the SAGE evaluation because this technique permits a focus on the class effects of SAGE; that is, these analyses specifically assess classroom effects rather than those of individuals within the classroom. The classroom effects examined by this approach are of primary importance to the SAGE evaluation.

General Findings 1996-97

1996-97 quantitative findings show that first grade classrooms in SAGE schools scored higher on the CTBS Complete Battery, Terra Nova Level 10 than first grade students in Comparison schools. In general, when adjusted for pre-test scores, SAGE students scored significantly higher on the post-test in the areas of reading, language arts, and mathematics as well as total score. This means that not all SAGE students outperformed all Comparison students. At the individual level of analysis, after controlling for pre-test score, SES, attendance, and race, SAGE first grade students as a group scored statistically significantly higher than Comparison school students on the CTBS post-test in the areas of language arts and mathematics as well as total score. At the class level of analysis, SAGE classrooms scored significantly higher in language arts, mathematics, and reading as well as total score after adjusting for individual pre-test results, SES, and attendance.

General Findings 1997-98

Analyses of the second year test data indicated that students in SAGE first grade classrooms achieved significantly higher scores than students in Comparison school classrooms in all tested areas: mathematics, reading, and language arts. The achievement advantage of students in SAGE first grade classrooms in 1996-97 was maintained in second grade in 1997-98. The advantage, however, did not appear to have increased significantly.

Score Metrics 1998-99

A brief discussion of the metrics reported in the 1998-99 SAGE evaluation is warranted. The SAGE report presents the findings using two metrics, scaled scores and normal curve equivalents. A scaled score provides a means for comparison across subjects or groups on a specific task or trait. A scaled score provides a common yardstick by which scores may be compared reasonably, subject to subject or group to

group. The primary reason scaled scores are used in the SAGE quantitative analysis is to anchor the scores from test level to test level (level 10, 11, etc.) so that year-to-year results can be compared.

When comparing the scores to those of other individuals (or groups) to obtain meaning, we make a norm-referenced interpretation. Here the use of normal curve equivalents is useful. A norm-referenced interpretation involves comparing a person's score with those of some relevant group of people. The normal curve equivalent scale ranges from 1 to 100 and thus provides a comparative index of the performance of an individual or group to the reference group. In this case, the reference group is the Terra Nova norm reference group (for norm referencing population data see (CTB/McGraw-Hill, 1991). Normal curve equivalents are generally not good indicators of longitudinal progress, however. With these scores, the group average could remain at, for example 50, across pre-test and post-test with the reader erroneously concluding that no gain was made. Actually, if the focus group, in this example, did not "gain" more than the reference group and the score would remain constant although both groups scored higher.

Structure of 1998-99 Report

The descriptive analyses utilize both scale scores and normal curve equivalents. The inferential analyses (regressions and hierarchical linear models) utilize only scale scores. For the inferential tests, a significance level of .05 was used and significant results are denoted by an asterisk (*). SAGE versus comparison analyses are divided into three major sections: (1) First Grade Results, (2) Second Grade Results, (3) Third Grade Results. The following are presented within each of these sections: (1) descriptive statistics (pre-test and post-test), (2) ordinary least squares regressions, (3) analyses of the scores of African American students, and (4) hierarchical linear models.

The quantitative section includes additional analyses looking at years of participation in SAGE, socio-economic status, and types of classroom. The quantitative section also includes "within SAGE" analyses for first through third grade students. SAGE student achievement is examined in relation to teacher experience, student participation, proximity to curriculum, and class organization.

SAGE School/Classroom vs. Comparison School/Classroom Analyses

First grade Results 1998-99

Descriptive Statistics

Valid Test Scores. The number of first grade students for whom the valid test scores are available is substantially less than the total number of students. There are four main explanations for this. First, the evaluation team presented schools with the option of allowing EEN and ESL students to take the test, even though the test may be inappropriate for these students. These scores were invalidated based on a "Nonvalid/Missing Test Report," developed by the evaluation team and completed for all first grade classes. Second, given withdrawals and enrollments during the school year, a number of students had valid pre-test scores, but no post-test scores and vice versa. Third, some students took the reading and language arts components of the CTBS, or the mathematics component, but not both. Consequently, total scores are unavailable for these students. Finally, some of the students did not complete the pre-test, post-test, or both the pre- and post-tests. The number of valid test scores for the 1998-99 school year are presented in Table 8.

Table 8. Number of 1998-99 First grade Students with Valid Test Scores

	Pre-Test		Post-Test	
	SAGE	Comparison	SAGE	Comparison
Reading	1409	862	1335	874
Language Arts	1409	862	1335	874
Mathematics	1406	858	1328	869
Total	1396	855	1324	853

Table 9 gives the nationwide Scale Score Descriptive Statistics for the test. Lowest and Highest obtainable scale scores as well as mean and standard deviation are provided for each level of each sub-test.

Table 9. Scale Score Descriptive Statistics

	Lowest Obtainable Scale Score	Highest Obtainable Scale Score
Reading		
Level 10 (first grade pre-test)	355	626
Level 11 (first grade post-test)	407	701
Level 12 (second grade)	423	722
Level 13 (third grade)	427	750
Mathematics		
Level 10 (first grade pre-test)	290	629
Level 11 (first grade post-test)	324	680
Level 12 (second grade)	347	720
Level 13 (third grade)	385	740
Language Arts		
Level 10 (first grade pre-test)	325	620
Level 11 (first grade post-test)	400	680
Level 12 (second grade)	424	706

Level 13 (third grade)	455	730

Pre-Test (Baseline) Results. Table 10 provides descriptive statistics from the SAGE evaluation pre-test (baseline) results. Both Scale Scores and Normal Curve Equivalents are presented for both SAGE and Comparison students. Given the longitudinal nature of the SAGE evaluation, scale scores serve as the primary measure of student achievement.

Table 10. SAGE and Comparison Population Descriptive Statistics on CTBS PRE-TEST Results for 1998-99 First grade Students

	SCALE SCORES				NORMAL CURVE EQUIVALENT			
	SAGE		Comparison		SAGE		Comparison	
	Mean	S.D.	Mean	S.D.	Mean	S.D	Mean	S.D.
Reading	533.85	37.85	539.54	41.21	44.52	20.77	48.37	21.70
Language Arts	533.59	43.54	536.84	46.40	45.67	21.89	47.67	22.57
Mathematics	492.93	41.19	501.22	40.97	43.40	19.31	47.45	19.50
Total	520.36	35.74	526.12	36.71	43.96	19.82	47.48	20.00

Difference of Means Test. The results from difference of means tests between SAGE and Comparison student scale scores from the Fall 1998 CTBS Level 10 Pre-Test are reported in Table 11. Comparison school students scored significantly higher than SAGE school students on all sub-tests and the total scale at the .05 level. We reject the null hypothesis that there is no difference between SAGE and Comparison school students on the pre-test. It should be noted that the composition of the Comparison schools changed when a number of Comparison schools withdrew from the study, and new schools joined the study as Comparison schools. The relative higher performance of the new Comparison schools was thus adjusted statistically.

Table 11. Differences of Means Test on CTBS FALL PRE-TEST for 1998-99 First Grade Students

	SAGE	Comparison	Difference
Reading	533.85	539.54	-5.69*
Language Arts	533.59	536.84	-3.25*
Mathematics	492.93	501.22	-8.29*
Total	520.36	526.12	-5.76*
* Significant at .05 level			

As noted above, student populations varied in SAGE and Comparison schools due to withdrawals and within-year enrollments. The post-test results are based only on those first- grade students who remained in their schools for the entire 1998-99 school year. CTBS allows for measurement of performance over time and therefore pre-test and post-test scores are comparable from a measurement position. The CTBS Complete Battery, Terra Nova Level 10 was administered to first grade students in the fall and the CTBS Complete Battery, Terra Nova Level 11 was administered to first graders in the spring.

Table 12. SAGE and Comparison Population Descriptive Statistics on CTBS POST-TEST Results for 1998-99 First grade Students

	SCALE SCORES				NORMAL CURVE EQUIVALENT			
	SAGE		Comparison		SAGE		Comparison	
	Mean	S.D.	Mean	S.D.	Mean	S.D	Mean	S.D.
Reading	578.44	41.64	576.45	39.62	51.42	21.22	50.34	20.25
Language Arts	583.14	42.69	578.82	44.74	54.25	20.39	52.12	21.28
Mathematics	538.51	40.21	530.47	40.85	51.53	19.58	47.59	20.16
Total	566.88	35.71	562.34	36.54	52.82	19.96	50.27	20.44

Results of the difference of means test between SAGE and Comparison schools on the CTBS Level 11 post-test are presented in Table 13. Statistically significant differences are found in favor of SAGE students for the language arts sub-test, mathematics sub-test, and for total scale scores on the post-test.

Table 13. Differences of Means Test on CTBS FALL POST-TEST for 1998-99 First grade Students

	SAGE	Comparison	Difference
Reading	578.44	576.45	1.99
Language Arts	583.14	578.82	4.32*
Mathematics	538.51	530.47	8.04*
Total	566.88	562.34	4.54*
*Significant at .05 level			

The largest gain difference in SAGE student scores from pre-test to post-test, relative to Comparison school students, was on the mathematics sub-test (16.33) shown in Table 14. The smallest relative gain difference for SAGE students from pre-test to post-test relative to Comparison school students was on the reading sub-test (7.57).

Table 14. Change in Mean Score from PRE-TEST to POST-TEST for 1998-99 First grade Students

	SAGE Gain	Comparison Gain	Gain Difference
Reading	49.55	41.98	7.57*
Language Arts	44.59	36.91	7.68*
Mathematics	45.58	29.25	16.33*
Total	46.52	36.22	10.30*
* Significant at .05 level			

Regression Analysis

Regression Models. The effect of the SAGE program on student achievement, controlling for other factors, was tested through a series of ordinary least squares regression models for each sub-test and for total scale scores. Control variables were entered into the models in blocks, with the SAGE/Comparison student variable entered into the models last.

The first block of control variables included student scores on the pre-test and school attendance, measured as number of days absent, as reported by teachers in Spring 1999. Eligibility for subsidized lunch, as an indicator of family income, is also included in the first block of control variables. This variable is coded 0 if student is ineligible, 1 if student is eligible for reduced price lunch, and 2 if the student is eligible for free lunch (this variable is assumed to be interval level). The second block of control variables included dummy variables for race/ethnicity, coded 1 if a student was of a certain race/ethnicity, and 0 if not. Dummy variables were included for African Americans and whites. A residual category, "other", is included in the constant term in the regression equations. In the final block, a dummy variable for SAGE or Comparison school student was entered on the third block. This variable is coded 0 if a student is from a Comparison school and 1 if a student is from a SAGE school.

Regression Results. Results of the regression analyses are presented in Table 15. For all analyses, SAGE emerges as a significant predictor of student achievement on the post-test, while controlling for pre-test scores, family income, school attendance, and race/ethnicity. The magnitude of the effect of SAGE on student achievement, as denoted by the "b" coefficient, varies depending on the CTBS sub-test.

The largest effects of SAGE are found on the math sub-test (12.454), while the smallest effects of SAGE are found on the reading sub-test (6.010). When all cases are analyzed the goodness-of-fit of the models (as denoted by the adjusted R square statistic), ranges from .257 (reading sub-scale score) to .514 (total scale score). This means that when predicting the reading score and total score, the variables included in the model explain 26% and 51% of the variance respectively. Most of the variance in the post-test scores is, of course, explained by the pre-test scores.

Explained Variance in Achievement Scores. Attendance (as represented by "days absent") emerges as a consistent and statistically significant predictor of performance on all sub-tests and total scale score. Family income as denoted by the "Lunch Eligibility" variable also emerges as a consistent and statistically significant predictor of performance on all sub-tests and total scale score. "Race" shows some relatively large effects (as denoted by the b coefficients), but the effects are highly variable and are only sometimes statistically significant (race is discussed further below). Membership in SAGE schools has a consistently positive, statistically significant effect on achievement on the CTBS.

Table 15. Scale Scores Regression – First Grade Block Three Beta Coefficients

	Reading	**Language Arts**	**Math**	**Total**
Pre-Test Score	.445*	.530*	.601*	.699*
Days Absent	-.395*	-.543*	-.447*	-2.278*
Lunch Eligibility	-6.620*	-3.706*	-1.644*	-.348*
African American	-.168	-2.434	.698	-.424
White	4.076*	4.572*	3.581*	1.527
SAGE	6.010*	7.021*	12.454*	8.490*
Constant	349.224*	306.648*	244.849*	206.638*
Adjusted R Squared	.257	.358	.409	.514
Standard Error	35.53	34.81	31.53	25.29
*Significant at .05 level				

African American Students

Among minority students in SAGE and Comparison schools, African Americans clearly comprise the largest group of valid test scores – roughly 22 percent of SAGE students and 20 percent of Comparison

school students. In the analyses to follow, African American first grade students are first compared across SAGE and Comparison schools on CTBS sub-test and total scale scores. Second, African American first grade students are compared to white students across SAGE and Comparison schools on CTBS total scale scores.

SAGE vs. Comparison. Table 16 provides comparisons of means on the CTBS post-test and change scores from pre-test to post-test. On the post-test, African American SAGE students scored higher than African American Comparison school students on every sub-test and on total scale score. There are statistically significant differences between SAGE and Comparison students in the language arts, mathematics, and total sub-tests. In addition, the differences between SAGE and Comparison students on mean change scores from pre-test to post-test scores are all statistically significant. African American SAGE students scored lower on the CTBS pre-test than African American Comparison school students, but made significantly larger gains than Comparison school students from pre- to post-test and surpassed African American Comparison school students on the post-test.

Table 16. African American Post-Test and Change Scores, by SAGE or Comparison School for 1998-99 First Grade Students

SCALE SCORE	SAGE	COMPARISON	DIFFERENCE
Language Arts			
Mean Post-Test	573.58	560.51	13.07*
Mean Change Pre to Post	48.02	37.82	10.20*
Reading			
Mean Post-Test	570.75	564.01	6.74
Mean Change Pre to Post	45.21	30.94	14.27*
Mathematics			
Mean Post-Test	526.81	515.57	11.24*
Mean Change Pre to Post	48.90	32.25	16.65*
Total			
Mean Post Test	557.70	546.98	10.72*
Mean Change, Pre to Post	47.72	34.17	13.55*
*significant at .05 level			

African American and White Achievement. African American first grade students scored significantly lower than white students on the CTBS pre-test total scale score, as shown in Table 17. This result holds for both SAGE and Comparison schools. When all cases are analyzed, African- American SAGE students achieved greater gains on the CTBS total scale score than white SAGE students from pre- to post-test, closing the achievement gap (though the gap remains statistically significant). In contrast, African Americans in Comparison schools showed lesser gains and the achievement gap widened in the Comparison schools.

Table 17. African American and White Achievement in SAGE and Comparison Schools

on Total Scale Scores for 1998-99 First Grade Students

	PRE-TEST	POST-TEST	CHANGE
SAGE SCHOOLS			
African American	509.24	557.70	48.46
White	533.23	577.96	44.73
Difference	-23.99*	-20.26*	3.73*
COMPARISON SCHOOLS			
African American	512.36	546.98	34.62
White	537.88	574.93	37.05
Difference	-25.52*	-27.95*	-2.43
*significant at .05 level			

Hierarchical Linear Modeling

Many social science research analyses involve hierarchical data structures. Hierarchical data structures are those in which individual units are nested within larger units, the latter being the unit of interest. The SAGE data are a prime example: students are nested within classrooms, and it is the classroom effect that is of particular interest to the SAGE project. Hierarchical data structures pose special analytical challenges in that data analysis at the individual level may result in a biased impression of the effect of the nesting unit (in the SAGE case, the classroom). An analytical approach known as "hierarchical linear modeling" or HLM (Bryk & Raudenbush, 1992) was specifically designed to accommodate these types of data structures. HLM was used with the SAGE data to provide an alternative and less biased account of the effects of SAGE experience on test scores. In these models, variables associated with individual students are referred to as level-1 variables and those associated with the classrooms are referred to as level-2 variables.

Analyses were conducted for each of the relevant criterion post-test scores: reading, mathematics, language arts, and total. For all analyses, the level-1 variables were pre-test achievement scores, attendance, and SES measured as eligibility for subsidized lunch. The post-test scores were adjusted for these three variables at the individual level, therefore the effects may be thought of as being statistically

independent of the effects of these variables. Three different level-2 models are reported here: Model A specifies "class size" as the only level-2 variable, Model B includes both "class size" and "SAGE" variables, and Model C includes both "class SES" and "class size" variables. Class SES was computed as the student SES average within each class and was therefore a measure of class poverty.

Table 18 provides a summary of the effects of each of the level-1 and level-2 variables for each of these analyses. Level-1 effects can be interpreted as the weighted average of the within-classroom effects of the level-1 variables. Level-2 effects can be interpreted as the classroom effects of the level-2 variables. The level-1 results indicate that within classrooms, lower individual SES is related to lower post-test scores and higher pre-test scores are related to higher post-test scores. The coefficients associated with the level-2 variables can be thought of as classroom effects.

Table 18. HLM Results for 1998-99 First Grade Students: First Grade Pre-Test as Control

Source	Total	Reading	Language Arts	Math
Level 1**				
Pre-Test	0.806	0.592	0.575	0.689
SES	-1.063	-3.804	-3.253	-1.478
Attendance	-0.115	-0.208	-0.701	-0.184
Level 2				
A. Class Size	-0.855*	-0.539*	-0.734*	-1.265*
B. Class Size	-1.945*	-1.634*	-2.041*	-2.197*
SAGE	-16.116*	-16.427*	-19.304*	-13.850*
C. Class SES	-12.672*	-14.342*	-13.490*	-10.585*
Class Size	-0.795*	-0.461	-0.653*	-1.197*

Model A. *Class Size.* These models examined the effect of class size on the adjusted criterion score. Class size equals the number of students divided by the number of teachers. Depending on the test, an increase in class size of one person can be expected to produce a .54 to 1.27 scale score point loss in average post-test performance. HLM results indicate the classroom level effect of the SAGE program and are therefore more powerful than the regression results in understanding of the program.

Model B. *Class Size, SAGE.* Combining class size and SAGE participation in a single analysis isolates the effects that SAGE might have beyond those produced by lower class size. However, due to the redundancy of these two variables in this case, this effect is not apparent and can be assumed to be zero.

It is instructive to view the results of model B in the context of model A results. Due to the multicollinearity of the SAGE and class size variable (i.e., they are very highly correlated), in model B the class size effect increases from that in model A. Concomitantly, the SAGE effect is negative to compensate for this effect. This is a statistical phenomenon, not an interpretable result.

Model C. *Class SES, Class Size*. These models examined the effect of class size on the adjusted criterion score after the classrooms were SES adjusted, viewed as the effect of class size once the effects of the classroom SES are removed. Since socioeconomic status is known to have an influence on academic test scores, a replacement for this variable was used as both a level-1 and level-2 predictor. The level-2 variable was the average SES for the class and estimates the effect of the overall class SES level beyond that associated with the individual, which is accounted for in the level-1 model. This model combines class SES and class size. The results indicate that class SES has a significant effect on the class average post-test performance. The effect of a 1 point class average gain in SES (recall coding: ineligible = 0, reduced = 1, eligibility for free lunch = 2) equates to between a 11 point and 14 point loss on the average post-test score, depending on the sub-score. SES was measured on a three-point family income scale, thus a one point difference on average would be quite pronounced. Class size still has a significant (although smaller) effect on the post-test scores once SES has been accounted for in all areas except for reading.

Second Grade Results 1998-99

Descriptive Statistics

Valid Test Scores. Analyses were conducted to assess the impact of SAGE on the 1998-99 second grade CTBS Complete Battery, Terra Nova Level 12 post-test results. There were 1446 persisting second grade students (i.e., students present in both the 1997-98 SAGE and comparison first grade classrooms and the 1998-99 SAGE and comparison second grade classrooms). Second grade post-test results are compared to the first grade pre-test, as well as first grade post-test. Therefore, only those students who took both the first grade pre-test and post-test, as well as the second grade post-test, were used in the 1998-99 second grade analysis. As would be expected, the number of second grade students having all three valid test scores was substantially less than the total number of students. The number of valid test scores for the Fall 1997 first grade pre-test, the Spring 1998 first grade post-test, and the Spring 1999 second grade post-test are presented in Table 19.

Table 19. Number of 1998-99 Second Grade Students with Valid Test Scores

	Fall 1997 First Grade Pre-test		Spring 1998 First Grade Post-test		Second GradeTest	
	SAGE	Comparison	SAGE	Comparison	SAGE	Comparison
Reading	1386	865	1247	797	1312	893
Language Arts	1386	864	1248	797	1312	893
Mathematics	1385	859	1264	793	1318	881
Total	1370	846	1241	782	1300	871

Pre-Test (Baseline) Results. Both the first grade pre-test and the first grade post-test served as baseline measures. Tables 20, 21 and 22 provide descriptive statistics on the scale scores from the first- grade pre- and post-test.

Table 20. Descriptive Statistics on CTBS First Grade Pre-Test and Post-Test and Second Grade Test (SAGE)

	FIRST GRADE PRE-TEST				FIRST GRADE POST-TEST			
	SCALE SCORES		NORMAL CURVE EQUIVALENT		SCALE SCORES		NORMAL CURVE EQUIVALENT	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Reading	533.39	36.41	44.05	20.32	581.26	40.92	52.96	20.60
Language Arts	530.55	43.75	44.11	21.47	587.12	44.51	56.27	20.93
Mathematics	492.43	42.63	43.28	19.70	539.29	40.06	52.00	19.34
Total	519.12	35.35	43.29	19.58	569.50	36.22	54.36	20.06

Table 21. Descriptive Statistics on CTBS First Grade Pre-Test and Post-Test and Second Grade Test (Comparison)

	FIRST GRADE PRE-TEST				FIRST GRADE POST-TEST			
	SCALE SCORES		NORMAL CURVE EQUIVALENT		SCALE SCORES		NORMAL CURVE EQUIVALENT	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Reading	535.02	36.20	45.19	19.11	572.25	44.58	48.48	21.53
Language Arts	528.95	43.34	43.24	21.11	575.85	46.01	50.94	21.24
Mathematics	493.00	38.34	43.35	18.13	526.80	41.61	46.00	19.44
Total	519.48	33.33	43.45	18.33	558.55	37.80	48.42	20.57

Table 22. SAGE and Comparison Descriptive Statistics on CTBS Results for 1998-99 Second Grade Test

	SCALE SCORES				NORMAL CURVE EQUIVALENT			
	SAGE		Comparison		SAGE		Comparison	
	Mean	S.D.	Mean	S.D.	Mean	S.D	Mean	S.D.
Reading	608.96	34.63	603.67	37.92	50.36	17.94	47.78	18.61
Language Arts	611.55	39.39	600.49	38.47	50.38	19.85	44.82	19.12
Mathematics	571.68	39.39	555.61	40.29	49.62	19.92	41.41	19.99
Total	597.72	33.14	586.78	33.66	50.63	18.99	44.35	18.99

Difference of Means Test. The difference of means between SAGE and Comparison students on the second grade test can be seen in Table 23. SAGE students scored significantly higher in every sub test and the total score.

Table 23. Differences of Means Test 1998-99 Second Grade Test

	SAGE	Comparison	Difference
Reading	608.96	603.67	5.29*
Language Arts	611.55	600.49	11.06*
Mathematics	571.68	555.61	16.07*
Total	597.72	586.78	10.94*
*significant at .05 level			

Results of the difference of means test between SAGE and Comparison schools on

the second grade post-test can be seen in Table 24. Table 24 shows that when the first grade pre-test is used as the baseline score, significant results are found on the reading sub-scale, language arts sub-scale, mathematics sub-scale, and total score. When the first grade post-test is used as the baseline score, there are significant results for the language arts sub-scale, math sub-scale, and total score, but no significant results are found for the reading sub-scale. This suggests that the statistically significant positive effects of SAGE occurred in the first grade. These positive effects were maintained and significantly increased in second grade in all areas except reading.

Table 24. SAGE and Comparison Gain

	From First grade Pre-Test to Second Grade			From First grade Post-Test to Second Grade		
SCALE SCORE	SAGE Gain	Comparison Gain	Gain Difference	SAGE Gain	Comparison Gain	Gain Difference
Reading	71.45	62.73	8.72*	26.90	26.32	.59
Language Arts	74.84	61.32	13.53*	23.88	16.98	6.90*
Mathematics	74.66	55.94	18.71*	32.60	23.45	9.15*
Total	73.55	60.42	13.13*	27.87	22.20	5.68*
*significant at .05 level						

Regression Analysis

Regression Models. The effect of the SAGE program on student achievement for second graders was also tested through a series of ordinary least squares regression models for each sub-test and total scale score. Control variables were again entered into the models in blocks, with the SAGE/Comparison student variable entered into the models last. In addition, two different regressions were done for each sub-test and total scale score. The first regression used the first- grade pre-test as a predictor variable and the second regression used the first grade post-test as a predictor variable.

The first block of control variables included student scores on the first grade pre-test or post-test, attendance, and eligibility for subsidized lunch as an indicator of family income. As with the first graders (discussed earlier), the second block of control variables included dummy variables for race/ethnicity. Finally, a dummy variable for SAGE or Comparison school student was entered on the third block. As with the first graders, this variable is coded 0 if a student is from a Comparison school and 1 if a student is from a SAGE school.

Regression Results. Results of the regression analyses are presented in Tables 25 and 26. When either the first grade pre-test or the first grade post-test is used as the predictor variable, membership in SAGE emerges as a significant predictor of student achievement on the total score and for all sub-tests except reading. The magnitude of the effect of SAGE on student achievement, as denoted by the "b" coefficient, varies depending on the CTBS sub-test.

The largest effects of SAGE are found when the first grade mathematics pre-test is used to predict the second grade test (18.650). When all cases are analyzed, the goodness-of-fit of the models (as denoted by the adjusted R square statistic), ranges from .26 to .56. Most of the variance, as was the case with the first graders, is explained by the baseline scores (either the first grade pre-test or the first grade post-test). "Family Income" , "Attendance", and "Race" show some relatively large effects (as denoted by the b coefficients) and these effects are usually statistically significant. Most importantly, membership in SAGE schools has a consistently statistically significant positive effect on all sub-tests and the total score. A negative relationship suggests that if these conditions are present, the test score will be lower.

Table 25. Scale Scores Regression – Second Grade Block Three Beta Coefficients: First Grade Pre-Test as Control

	Reading	Language Arts	Math	Total
Pre-Test Score	.375*	.448*	.557*	.626*
Days Absent	-.304*	-.276	-.368*	-.182*
Lunch Eligibility	-5.548*	-4.183*	-6.259*	-4.032*
African American	-2.807	-7.883*	-10.002*	-6.512*
White	8.624*	3.318	2.803	3.131*
SAGE	7.804*	13.917*	18.650*	13.278*
Constant	419.911*	392.475*	324.864*	289.110*
Adjusted R Squared	.256	.335	.445	.513
Standard Error	30.93	31.77	30.82	23.53
*Significant at .05 level				

Table 26. Scale Scores Regression – Second Grade Block Three Beta Coefficients: First Grade Post Test as Control

	Reading	Language Arts	Math	Total
Pre-Test Score	.394*	.445*	.559*	.602*
Days Absent	-.279*	-.205	-.102	.010
Lunch Eligibility	-6.204*	-4.508*	-4.884*	-4.222*
African American	-4.583*	-6.256*	-9.171*	-5.976*
White	6.919*	3.536	5.116*	3.252*
SAGE	4.135*	10.803*	12.259*	8.607*
Constant	390.807*	368.313*	289.386*	269.397*
Adjusted R Squared	.347	.360	.475	.561
Standard Error	28.43	31.03	29.29	22.13
*Significant at .05 level				

African American Students

As in first grade, African American second grade students comprise the largest minority subgroup of valid test scores – roughly 25% of all SAGE students and 22% of all Comparison students. In the analyses to follow, African American students are first compared across SAGE and Comparison schools on the CTBS sub-tests and total scale score. Second, African American students are compared to white students across SAGE and Comparison schools on the CTBS Total Scale Score.

SAGE vs. Comparison. Table 27 provides comparisons of means on the CTBS second- grade test, as well as change scores from the first grade pre-test to the second grade test and from the first grade post-test to the second grade test. On the second grade test, African American SAGE students scored higher than Comparison school students on every sub-test and on the total scale score. The differences between African American SAGE students and African American Comparison students on the second grade test scores are statistically significant. When using the first grade pre-test as the baseline score, statistically significant change scores are found on all scores. SAGE African American student performance is still ahead of slightly larger non-significant gain. Using the first grade post-test as the baseline score shows statistically significant differences between SAGE and Comparison schools on the mathematics sub-test only. Comparison school students made a larger gain on the reading sub-test, but the gain is not statistically significant.

Table 27. African American Post-Test and Second Grade Change Scores, by SAGE or Comparison

SCORE	SAGE	COMPARISON	DIFFERENCE
Language Arts			
Mean Second grade Score	595.85	584.33	11.52*
Mean Change From First grade Pre-Test to Second Grad	72.65	56.27	16.38*
Mean Change From First grade Post-Test to Second Grade	21.09	18.75	2.34
Reading			
Mean Second grade Score	595.94	587.81	8.13*
Mean Change From First grade Pre-Test to Second Grade	70.97	57.73	13.24*
Mean Change From First grade Post-Test to Second Grade	20.88	27.19	-6.31
Mathematics			
Mean Second grade Score	551.52	534.86	13.66*
Mean Change From First grade Pre-Test to Second Grade	74.24	47.41	26.83*
Mean Change From First grade Post-Test to Second Grade	28.79	20.41	8.38*
Total			
Mean Second grade Score	581.53	569.01	12.52*
Mean Change From First grade Pre-Test to Second Grade	72.12	54.03	18.09*
Mean Change From First grade Post-Test to Second Grade	24.04	22.05	1.99
*significant at .05 level			

African American and White Achievement. African American students scored lower than white students on the first grade pre-test total scale score, as shown in Table 28. This result is statistically significant for both SAGE and Comparison schools, though the gap between African Americans and whites is larger in the SAGE schools. The change from the first grade post-test to the second grade test shows that the SAGE

African Americans kept pace with white students but did not further close the achievement gap in second grade.

Table 28. African American versus White Achievement on Total Scale

	First Grade Pre-Test	First Grade Post-Test	Second Grade	Change From Pre-Test to Second	Change From Post-Test to Second
SAGE					
African American	502.90	556.83	581.53	72.12	24.04
White	531.27	580.29	608.67	73.51	27.69
Difference	-28.37*	-23.46*	-27.14*	-1.39	-3.65
Comparison					
African American	509.98	541.87	569.01	54.03	22.05
White	528.60	570.18	597.68	64.46	23.57
Difference	-18.62*	-28.31*	-28.67*	-10.43*	-1.52
*significant at .05 level					

Hierarchical Linear Modeling

Hierarchical linear models were used to evaluate the second grade achievement results using the same series of models used to assess first grade results. Two sets of analyses were done. The first, shown in Table 29, used first grade pre-test as the initial achievement level of the students. The second, shown in Table 30, used first grade post-test as the initial achievement level of the students.

HLM results. Tables 30 and 31 provide a summary of the effects of each of the level-1 and level-2 variables for each of these analyses. Level-1 effects can be interpreted as the weighted average of the within-classroom effects of the level-1 variables. Level-2 effects can be interpreted as the classroom effects of the level-2 variables.

Table 29. HLM Results for 1998-99 Second grade Students – First Grade Pre-Test as Initial Achievement

Source	Total	Reading	Language Arts	Mathematics
Level 1				
Pre-Test	0.7190	0.497	0.496	0.568
SES	-3.859	-9.331	-8.091	-6.094
Attendance	-0.014	0.371	-0.322	-0.350
Level 2				
A. Class Size	-1.021*	-0.758*	-0.807*	-1.507*
B. Class Size	-1.215*	-1.233*	-0.551	-1.799*
SAGE	-2.995	-7.399	3.954	-4.634
C. Class SES	-16.464*	-16.966*	-16.267*	-20.884*
Class Size	-0.948*	-0.654*	-0.746*	-1.398*
*significant at .05 level				

Table 30. HLM Results for 1997-98 Second grade Students – First Grade Post Test as Initial Achievement

Source	Total	Reading	Language Arts	Mathematics
Level 1				
Post-Test	0.657	0.510	0.453	0.636
SES	-5.201	-5.726	-3.913	-2.285
Attendance	0.089	-0.182	0.221	0.304
Level 2				
A. Class Size	-1.048*	-0.748*	-0.799*	-1.607*
B. Class Size	-1.282*	-1.364*	-0.532	-1.824*
SAGE	-3.611	-9.634*	4.193	-3.391
C. Class SES	-16.805*	-17.047*	-16.932*	-22.078*
Class Size	-0.985*	-0.658*	-0.761*	-1.486*
*significant at .05 level				

Model A. *Class Size*. Depending on the test, an increase in class size of one person can be expected to produce a .75 to 1.6 scale score loss in average post-test performance. In other words, the more students in a class, the lower the average class achievement score. The results for all scores show this effect to be significant. Because the HLM adjusts for differences in class size, it is a better indication of what is actually occurring at the classroom level. It is noteworthy that the results of Tables 29 and 30 for the Model A are similar, indicating that the second grade class size has little effect on the two year gain (first grade and second grade) versus the one year gain (second grade only). The positive effect of reduced class size is maintained from first grade post-test to second grade test, but not increased. It may appear that the regression and HLM results are contradictory. The HLM results are, however, consistent with the regression results because individuals in SAGE classrooms perform better than individuals in Comparison classrooms, and SAGE classrooms have fewer students. As was discussed relative to first grade findings, HLM results indicate the classroom level effect of the SAGE program and are therefore more powerful than the regression results in understanding of the program.

Model B. *Class Size, SAGE.* Combining class size and SAGE participation in a single analysis isolates the effects that SAGE might have beyond those produced by lower class size. However, due to the redundancy of these two variables in this case, this effect is not apparent and can be assumed to be zero.

It is instructive to view the results of model B in the context of model A results. Due to the multicollinearity of the SAGE and class size variable (i.e., they are very highly correlated), in model B the class size effect increases from that in model A. Concomitantly, the SAGE effect is negative to compensate for this effect. This is a statistical phenomenon, not an interpretable result.

Model C. *Class SES, SAGE*. As in the first grade analysis, this model combines class SES and class size. The results indicate that class SES has a significant effect on the class average post-test performance. Class size still has a significant effect on the post-test scores once SES has been accounted for, although the effects are somewhat attenuated.

Third Grade Results 1998-99

Descriptive Statistics

Valid Test Scores. Analyses were conducted to assess the impact of SAGE on the 1998-99 third grade CTBS Complete Battery, Terra Nova Level 13 post-test results. There were 1702 persisting students in third grade (i.e., students present in both the 1996-97 SAGE and comparison first- grade classrooms and in the 1997-98 SAGE and comparison second grade classrooms), while there were 482 new third grade students (students who were not in the program last year). However, third grade test results are compared to the first grade pre-test, first grade post-test and the second grade test. Therefore, only those students who took both the first grade pre-test and post-test, the second grade test and the third grade test were used in the 1998-99 third grade analysis. As would be expected, the number of third grade students having all four valid test scores was substantially less than the total number of students. The number of valid test scores for the Fall 1996 first grade pre-test, the Spring 1997 first grade post-test, the Spring 1998 second grade test and Spring 1999 third grade test are presented in Table 31.

Table 31. Number of 1998-99 Third Grade Students with Valid Test Scores

	Fall 1997 First Grade Pre-test		Spring 1998 First Grade Post-test		Second Grade Test		Third Grade Test	
	SAGE	Comp	SAGE	Comp	SAGE	Comp	SAGE	Comp
Reading	981	475	1020	488	1202	590	1322	895
Language Arts	981	475	1020	488	1201	591	1322	895
Mathematics	971	469	1014	482	1206	586	1324	893
Total	959	460	1009	478	1194	576	1313	877

First Grade and Second Grade (Baseline) Results. First grade pre-test, first grade post-test, and second grade test scores served as a baseline. Table 32 provides descriptive statistics on the scale scores from the first grade pre-test, first grade post-test, and second grade test. Table 33 provides descriptive statistics for the third grade test.

Table 32. Descriptive Statistics Means (and Standard Deviations) on CTBS First Grade Pre-Test and

Post-Test and Second Grade Test (SAGE and Comparison)

	First Grade Pre-Test		First Grade Post-Test		Second Grade Test	
	SAGE	Comp	SAGE	Comp	SAGE	Comp
Reading	535.91	533.55	587.21	581.08	608.25	601.38
	(35.29)	(39.75)	(33.49)	(37.12)	(35.43)	(34.83)
Language Arts	534.43	529.53	586.88	577.81	610.80	598.42
	(41.07)	(42.48)	(35.11)	(40.21)	(40.42)	(39.41)
Math	495.72	491.88	550.60	540.23	571.70	560.19
	(37.49)	(37.98)	(40.97)	(41.62)	(41.91)	(38.03)
Total	522.18	518.63	575.05	566.28	597.10	587.27
	(32.55)	(33.65)	(30.35)	(32.83)	(33.75)	(32.55)

Table 33. SAGE and Comparison 1998-99 Descriptive Statistics CTBS Third Grade Test

	SCALE SCORES				NORMAL CURVE EQUIVALENT			
	SAGE		Comparison		SAGE		Comparison	
	Mean	S.D.	Mean	S.D.	Mean	S.D	Mean	S.D.
Reading	633.26	39.27	626.95	37.89	51.98	19.08	48.71	18.74
Language Arts	629.03	34.62	622.47	35.02	50.34	17.77	46.80	18.11
Mathematics	607.53	36.69	595.29	38.23	50.28	18.17	44.38	18.40
Total	623.42	33.33	615.29	33.56	51.19	18.28	46.73	18.41

Difference of Means Test. Results from the difference of means tests between SAGE and comparison student scores from the third grade test are reported in Table 34. As Table 34 shows, SAGE students scored significantly higher than Comparison students in all areas of the test.

Table 34. Differences of Means Test 1998-99 Third Grade Test

	SAGE	Comparison	Difference
Reading	633.26	626.95	6.31*
Language Arts	629.03	622.47	6.56*
Mathematics	607.53	595.29	12.24*
Total	623.42	615.29	8.13*
*significant at .05 level			

As noted previously, student populations varied in SAGE and Comparison schools due to withdrawals and within-year enrollments. The third grade results are based only on those third graders who were also in SAGE classrooms the entire 1996-97 first grade and 1997-98 second grade school years.

The results from the difference of means tests between SAGE and Comparison student scale scores from the Fall 1996 first grade pre-test, Spring 1997 first- grade post-test, and Spring 1998 second grade test and Spring 1999 third grade test are reported in Table 35. These results reflect comparisons on an individual student level, the differences in scores between SAGE and Comparison students. When the first grade pre-test is used as the baseline score, SAGE students made significantly higher gains on the reading sub-scale, mathematics sub-scale, and total score compared to Comparison students.

When the first grade post-test is used as the baseline score, the same significant results are found on the reading sub-scale, the mathematics sub-scale, and the total score. These results suggest that the positive effects of SAGE were maintained and significantly increased in second grade for the reading sub-scale, mathematics sub-scale, and total score.

When the second grade test scores are used for a baseline, the same statistically significant gains can be seen in reading, mathematics and the total score. As with the previous testing cycles, it appears that positive SAGE effects were maintained and again significantly increased in third grade.

The smallest relative gain for SAGE students from first grade pre-test to the third grade test was on the language arts sub-scale; this gain was not statistically significant. Comparison schools had larger comparative gains on the language arts sub-test from second grade to third grade; the gains were not statistically significant.

Table 35. SAGE and Comparison Gain

SCALE SCORE	From First Grade Pre-Test to Third Grade Test			From First Grade Post-Test to Third Grade Test			From Second Grade Test to Third Grade Test		
	SAGE Gain	Comp Gain	Gain Diff.	SAGE Gain	Comp Gain	Gain Diff.	SAGE Gain	Comp Gain	Gain Diff.
Reading	100.00	91.96	8.04*	49.57	44.09	5.49*	26.25	21.85	4.40*
Language Arts	95.75	91.34	4.41	44.33	43.81	.52	19.19	22.31	-3.11
Mathematics	113.55	98.26	15.29*	59.67	51.29	8.38*	36.40	29.42	6.98*
Total	102.91	94.45	8.46*	51.04	47.06	3.98*	27.33	24.33	3.00*
*significant at .05 level									

Regression Analysis

Regression Models. The effect of the SAGE program on student achievement for third graders was also tested through a series of ordinary least squares regression models for each sub-test and total scale score. Control variables were again entered into the models in blocks, with the SAGE/Comparison student variable entered into the models last. In addition, three different regressions were done for each sub-test and total scale score. The first regression used the first- grade pre-test as a predictor variable (Table 36), the second regression used the first grade post-test as a predictor variable (Table 37), and the third regression used the second grade test as a predictor variable (Table 38).

The first block of control variables included student scores on the first grade pre-test or post-test, attendance, and eligibility for subsidized lunch as an indicator of family income. As with the first and second graders (discussed earlier), the second block of control variables included dummy variables for race/ethnicity. Finally, a dummy variable for SAGE or Comparison school student was entered on the third block. As with the first and second graders, this variable is coded 0 if a student is from a Comparison school and 1 if a student is from a SAGE school.

Regression Results. Results of the regression analyses are presented in Tables 37-39. When either the first grade pre-test, the first grade post-test, or second grade test is used as the predictor variable, membership in SAGE emerges as a significant predictor of student achievement on the total score and for all sub-tests. The magnitude of the effect of SAGE on student achievement, as denoted by the "b" coefficient, varies depending on the CTBS sub-test.

The largest effects of SAGE are found when the first grade mathematics pre-test is used to predict the second grade test (16.105). When all cases are analyzed, the goodness-of-fit of the models (as denoted by the adjusted R square statistic), ranges from .20 to .50. Most of the variance, as was the case with the first and second graders, is explained by the baseline scores (either the first grade pre-test, first grade post-test, or second grade test). "Family Income" , "Attendance", "Race" show some relatively large effects (as denoted by the b coefficients) and these effects are usually statistically significant. This suggests that a student with a high absentee rate or from a low socio-economic status will have lower test scores. Most

importantly, membership in SAGE schools has a consistently statistically significant positive effect on all sub-tests and the total score.

Table 36. Scale Scores Regression – Third Grade Block Three Beta Coefficients: First Grade Pre-Test as Control

	Reading	Language Arts	Math	Total
Pre-Test Score	.395*	.351*	.505*	.578*
Days Absent	-.175	-.273	-.471*	-.255*
Lunch Eligibility	-5.042*	-3.922*	-3.183*	-3.152
African American	1.406	1.017	-5.889*	.106
White	6.375*	5.256*	-.203	1.441
SAGE	8.088*	5.716*	16.105*	9.114*
Constant	428.446*	447.082*	367.406*	328.689*
Adjusted R Squared	.224	.244	.367	.401
Standard Error	32.83	29.61	28.86	25.06
*Significant at .05 level				

Table 37. Scale Scores Regression – Third Grade Block Three Beta Coefficients: First Grade Post-Test as Control

	Reading	Language Arts	Math	Total
Pre-Test Score	.395*	.324*	.385*	.545*
Days Absent	-.208	-.355*	-.507*	-.306*
Lunch Eligibility	-4.702*	-4.732*	-4.274*	-3.656*
African American	1.073	1.459	-6.537	.753
White	9.598*	8.109*	2.255	5.266*
SAGE	7.719*	5.287*.	13.353*	7.249*
Constant	406.288*	444.875*	406.488*	315.941*
Adjusted R Squared	.220	.200	.333	.369
Standard Error	32.58	30.11	29.44	25.33
*Significant at .05 level				

Table 38. Scale Scores Regression – Third Grade Block Three Beta Coefficients: Second Grade Test as Control

	Reading	Language Arts	Math	Total
Pre-Test Score	.619*	.431*	.487*	.655*
Days Absent	-.03	-.286*	-.417*	-.206
Lunch Eligibility	-2.654*	-3.294*	-2.387*	-2.001*
African American	-.545	2.057	-2.001	2.152
White	6.428*	7.667*	4.531*	4.876*
SAGE	7.473*	4.735*	13.058*	7.107*
Constant	259.128*	368.882*	333.960*	234.681*
Adjusted R Squared	.392	.315	.399	.499
Standard Error	28.74	28.31	28.16	22.79
*Significant at .05 level				

African American Students

As in the first and second grade classrooms, African American third grade students comprise the largest subgroup of valid test scores – roughly 22% of all SAGE students and 23% of all Comparison students. In the analyses to follow, African American students are first compared across SAGE and Comparison schools on the CTBS sub-tests and total scale score. Second, African American students are compared to white students across SAGE and Comparison schools on the CTBS Total Scale Score.

SAGE vs. Comparison. Table 39 provides comparisons of means on the CTBS third grade test, as well as change scores from the first grade pre-test to the second grade test and from the first grade post-test to the second grade test, and from the second grade test to the third grade test. On the third grade test, African American SAGE students scored higher than African American Comparison school students on every sub-test and on the total scale score, and the differences between African American SAGE students and African American Comparison students on the third grade test scores are statistically significant.

When using the first grade pre-test as the baseline score, statistically significant change scores are found on all scores. Using the first grade post-test as the baseline score shows statistically significant differences between African American SAGE students and African American Comparison students on the math sub-test and total score. When using the second grade test as the baseline score, the reading and mathematics sub-tests and total scores show statistically significant change scores.

In general, African American SAGE students outperformed African American comparison students, although the difference was not significant in language arts from the first grade post-test and the second grade test to the third grade test.

Table 39. African American Third Grade Test and Change Scores, by SAGE or Comparison

SCORE	SAGE	COMPARISON	DIFFERENCE
Language Arts			
Mean Third grade Score	619.42	607.57	11.85*
Mean Change From First grade Pre-Test to Third Grade	104.20	90.05	14.15*
Mean Change From First grade Post-Test to Third Grade	48.89	44.71	4.18
Mean Change From Second Grade Test to Third Grade	28.73	24.47	4.26
Reading			
Mean Third grade Score	623.46	609.50	13.96*
Mean Change From First grade Pre-Test	105.64	92.43	13.21*

to Third Grade			
Mean Change From First grade Post-Test to Third Grade	50.69	43.75	6.94*
Mean Change From Second grade Test to Third Grade	29.87	18.94	10.93*
Mathematics			
Mean Third grade Score	592.68	570.73	21.95*
Mean Change From First grade Pre-Test to Third Grade	122.39	93.67	28.72*
Mean Change From First grade Post-Test to Third Grade	68.82	50.73	18.09*
Mean Change From Second grade Test to Third Grade	48.20	29.59	18.61*
Total			
Mean Third grade Score	612.02	596.44	15.58*
Mean Change From First grade Pre-Test to Third Grade	110.72	92.77	17.95*
Mean Change From First grade Post-Test to Third Grade	55.71	47.55	8.16*
Mean Change From Second grade Test to Third Grade	35.87	24.06	11.81*
*significant at .05 level			

African American and White Achievement. African American students scored lower than white students on the first grade pre-test total scale score, as shown in Table 40. This result is statistically significant for both SAGE and Comparison schools, though the gap between African Americans and whites is larger in the SAGE schools. The change from first grade post-test to the second grade test shows that the SAGE African Americans kept pace with white students, but did not further close the achievement gap in second grade.

The change from the second grade test to the third grade test shows SAGE African American students gaining significantly more that SAGE white students, closing the achievement gap further. This is not true for Comparison students.

Table 40. African American and White Achievement on Total Scale

	First Grade Pre-Test	First Grade Post-Test	Second Grade Test	Third Grade Test	Change From First Grade Pre-Test to Third Grade	Change From First Grade Post-test to Third Grade	Change From Second Grade to Third Grade
SAGE							
African American	503.65	559.37	577.17	612.02	110.72	55.71	35.87
White	533.43	582.67	606.99	632.58	99.58	50.93	25.88
Difference	-29.78*	-23.30*	-29.82*	-20.56*	11.14*	4.78	9.99*
Comparison							
African American	509.36	552.54	573.45	596.44	92.77	47.55	24.66
White	527.89	578.00	600.37	630.00	94.88	47.12	24.06
Difference	-18.53*	-25.46*	-26.92*	-33.56*	-2.11	0.43	0.60

*significant at .05 level

Hierarchical Linear Modeling

Hierarchical linear models were used to evaluate the third grade achievement results using the same series of models used to assess first and second grade results. Three sets of analyses were done. The first, shown in Table 41 used first grade pre-test as the initial achievement level of the students. The second, shown in Table 42, used first grade post-test as the initial achievement level of the students. The third, shown in

Table 43 used the second grade test as the initial achievement level of the students.

HLM results. Tables 42-44 provide a summary of the effects of each of the level-1 and level-2 variables for each of these analyses. Level-1 effects can be interpreted as the weighted average of the within-classroom effects of the level-1 variables. Level-2 effects can be interpreted as the classroom effects of the level-2 variables.

Table 41. HLM Results for 1998-99 Third Grade Students: First Grade Pre-Test as Initial Achievement

Source	Total	Reading	Language Arts	Mathematics
Level 1				
Pre-Test	0.671	0.510	0.363	0.432
SES	-5.257	-5.351	-6.843	-3.597
Attendance	-0.205	0.156	-0.053	-0.026
Level 2				
Class Size	-1.083*	-0.966*	-0.723*	-1.483*
B. Class Size	-1.261*	-1.362*	-1.140*	-1.339*
SAGE	-2.910	-6.478	-6.862	2.350
C. Class SES	-13.593*	-10.965*	-12.831*	-18.531*
Class Size	-0.979*	-0.882*	-0.646*	-1.346*
*significant at .05 level				

Table 42. HLM Results for 1998-99 Third Grade Students – First Grade Post-Test as Initial Achievement

Source	Total	Reading	Language Arts	Mathematics
Level 1				
Pre-Test	0.661	0.444	0.294	0.496
SES	-4.490	-6.514	-8.032	-4.247
Attendance	0.205	0.478	-0.111	-0.263
Level 2				
A. Class Size	-1.113*	-0.988*	-0.713*	-1.513*
B. Class Size	-1.363*	-1.438*	-1.011	-1.346*
SAGE	-4.045	-7.257	-4.793	2.713
C. Class SES	-14.243*	-11.603*	-12.726*	-18.270*
Class Size	-1.007*	-0.917*	-0.635*	-1.382*
*significant at .05 level				

Table 43. HLM Results for 1998-99 Third Grade Students – Second Grade Test as Initial Achievement

Source	Total	Reading	Language Arts	Mathematics
Level 1				
Pre-Test	0.707	0.757	0.433	0.537
SES	-2.369	-3.877	-5.398	-3.205
Attendance	0.178	0.343	-0.158	-0.107
Level 2				
A. Class Size	-1.067*	-0.961*	-0.724*	-1.503*
B. Class Size	-1.284*	-1.371*	-1.128	-1.229*
SAGE	-3.601	-6.705	-6.611	4.479
C. Class SES	-14.608*	-11.381*	-13.579*	-18.392*
Class Size	-0.971*	-0.882*	-0.644*	-1.370*
*significant at .05 level				

Model A. *Class Size.* Depending on the test, an increase in class size of one person can be expected to produce a .72 to 1.51 loss in average post-test performance. The results for all scores show this effect to be significant. It is noteworthy that the results of Tables 41-43 for the Model A are similar, indicating that the third grade class size has little effect on the three year gain and second grade class size has little effect on the two year gain. In other words, the positive effect of reduced class size is maintained, but not increased from the first grade post-test or second grade test. As was discussed relative to first and second grade findings, HLM results indicate the classroom level effect of the SAGE program and are therefore more powerful than the regression results in understanding of the program.

Model B. *Class Size, SAGE.* Combining class size and SAGE participation in a single analysis isolates the effects that SAGE might have beyond those produced by lower class size. However, due to the redundancy of these two variables in this case, this effect is not apparent and can be assumed to be zero.

It is instructive to view the results of model B in the context of model A results. Due to the multicollinearity of the SAGE and class size variable (i.e., they are very highly correlated), in model B the class size effect increases from that in model A. Concomitantly, the SAGE effect is negative to compensate for this effect. This is a statistical phenomenon, not an interpretable result.

Model C. *Class SES, SAGE.* As in the first grade analysis and second grade analyses, this model combines class SES and class size. The results indicate that class SES has a significant effect on the class average test performance. Class size still has a significant effect on the test scores once SES has been accounted for, although the effects are somewhat attenuated.

Effect Sizes

Because the sample sizes used in the analyses were very large, even small group differences will result in statistically significant results. In order to better characterize the actual differences between groups, effect-size indicators were constructed. Two different indicators were used. First an "unadjusted" effect size was computed by dividing the difference between the SAGE and comparison post-test means by their pooled standard deviation. Because these means are affected by pre-test, SES, and attendance differences, a second effect size measure was computed adjusting for these differences. This second measure used the raw score regression coefficient for the SAGE dummy variable in the regression analysis as an adjusted mean difference and divided this by the pooled standard deviation. The results of these computations are presented in Table 44 and should aid in the evaluation of the practical significance of the class-size advantage. The scale score values for the CTB level 10, 11, 12 and 13 tests are provided in Table 45 as an additional aid to the interpretation of the practical implications of the SAGE results.

Table 44. 1998-99 Adjusted and Unadjusted Effect Sizes

	First Grade		Second Grade		Third Grade	
	Adjusted	**Unadjusted**	**Adjusted**	**Unadjusted**	**Adjusted**	**Unadjusted**
Mathematics	.147	.049	.115	.147	.193	.163
Reading	.161	.099	.277	.283	.136	.189
Language Arts	.308	.199	.308	.404	.350	.328
Total Score	.236	.126	.258	.328	.213	.243

Table 45. Scale Score Descriptive Statistics

	Lowest Obtainable Scale Score	Highest Obtainable Scale Score
Reading		
Level 10 (first grade pre-test)	355	626
Level 11 (first grade post-test)	407	701
Level 12 (second grade)	423	722
Level 13 (third grade)	427	750
Mathematics		
Level 10 (first grade pre-test)	290	629
Level 11 (first grade post-test)	324	680
Level 12 (second grade)	347	720
Level 13 (third grade)	385	740
Language Arts		
Level 10 (first grade pre-test)	325	620
Level 11 (first grade post-test)	400	680
Level 12 (second grade)	424	706
Level 13 (third grade)	455	730

Additional Analyses

The 1998-99 SAGE data base provided the opportunity to examine some specific factors that may be related to student performance within the SAGE program. Specifically, the following research questions were addressed:

1. Is the number of years of SAGE program participation related to individual or class achievement gains in grades one, two and three?
2. Is the socio-economic status (as measured by participation in the school lunch program) of SAGE participants related to individual achievement gains in grades one, two and three?
3. Is the type of SAGE classroom configuration related to classroom achievement gains in grades one, two and three?

A description of the analytical method and a summary of the results of these analyses is presented below for each question.

Years of Participation.

The relationship between the number of years of participation in the SAGE program and academic achievement gains was examined at both the individual student level and the aggregate classroom level. At each grade level, the post-test scores at that grade served as the dependent variable. The independent variables included the previous grade post-test (for first grade, this was the first grade pretest), individual attendance, SES (as measured by school lunch participation), and number of years of SAGE participation. This latter variable is the factor of interest. Table 46 shows the number of cases analyzed at each grade level by the number of years of SAGE participation.

Table 46. Number of Cases by Grade Level

Years Participation	1998-99 Grade One	1998-99 Grade Two	1998-99 Grade Three
One	382	275	276
Two	1155	404	213
Three	0	1277	1234
Total	1537	1906	1723

The results of this analysis showed no statistically significant relationships between years of program experience and achievement gain in any of the content areas when pretest, attendance and SES were controlled with one exception. This was for the Total CTBS score for first graders where a significant negative relationship existed. While all of the first grade relationships were negative, this was the only statistically significant result. All results at grades two and three were in the expected positive direction, but none was statistically significant. It appears that the "new" first grade students (those without kindergarten experience in SAGE) in the 98-99 cohort outperformed those with this experience. It is not known how many of these students had preschool experience outside of the SAGE program, making this finding difficult to interpret.

Analysis of years of participation in the SAGE program was also examined at the classroom level. For these analyses, variables were computed to represent average classroom levels for each of the variables used in the individual analysis. That is, average pretest, post-test, attendance, SES and years of SAGE experience were computed for each of the SAGE classrooms. Analyses similar to those done at the individual level were then done at the classroom level. For these analyses, there were 92 first grade classrooms, 79 second grade classrooms, and 85 third grade classrooms. In first grade classrooms, no significant relationships emerged between average years of SAGE participation and classroom achievement gains on any of the CTBS scores. For grade two, significant results were found for the mathematics sub-test and the total score (which can probably be attributed to the mathematics portion). Here a strong positive relationship existed indicating that those classrooms with a higher proportion of SAGE experienced students outperformed those classrooms with lower proportions of SAGE experienced

students. At the third grade level, significant results were found only for the reading sub-test, however both the mathematics and language sub-tests showed strong positive, although non-significant, relationships.

Socio-Economic Status.

The relationship between socio-economic status (as measured by the lunch participation variable) and academic achievement gains was examined at the individual student level at each grade. Regression analyses were done for each CTBS sub-test and the total score in order to address this question. First grade post-test scores, second grade and third grade scores served as the dependent variables. The independent variables included the previous grade post-test (for first grade, this was the first grade pretest), individual attendance, and SES (as measured by school lunch participation). This latter variable is the factor of interest.

The results of these analyses are summarized in Table 47 which shows for each CTBS test and grade level where significant relationships were found. In all cases, the results indicate a negative relationship indicating that those with a lower SES index (higher actual SES) outperformed those with a higher SES index (lower actual SES).

Table 47. Significant Relationships for CTBS and SES by Grade Level

CTBS Subtest	98-99 Grade One	98-99 Grade Two	98-99 Grade Three
Reading	*	*	*
Language	*	*	*
Mathematics		*	*
Total		*	*
* = significant negative relationship found			

Type of Classroom.

The implementation of the SAGE reduced class size feature has taken a number of forms. However, there are primarily two configurations: "true" 15:1 ratio classrooms where an individual teacher has 15 or fewer students and 30:2 ratio classrooms where two (or more) teachers have been given responsibility for more than 15 students. As in the past, it was of interest to determine if there are any achievement advantages associated with either of these basic configurations. These analyses were done at the classroom level with average post test performance serving as the dependent variable in each case. Independent variables included the appropriate average pretest score and a dichotomous variable indicating classroom type. Statistically significant results were found in two areas of Grade Two as indicated in Table 48. In these cases, the 15:1 ratio classrooms outperformed the 30:2 ratio classrooms.

Table 48. Statistically Significant Results between 15:1 and 30:2 Classrooms

CTBS Subtest	1998-99 Grade One	1998-99 Grade Two	1998-99 Grade Three
Reading			
Language		*	
Mathematics		*	
Total		*	

* = significant relationship found favoring 15:1 over 30:2

Aggregated Results vs. Class Level Results

It is important to note that all of the generalizations provided in the quantitative analyses are based on aggregated results. By aggregated, we mean that the achievement scores from "small" classes are pooled and compared to those pooled from "large" classes. The result from these pooled scores is that on average one can expect a small class to gain .2 to .3 standard deviations (2 or 3 months) more than a large class in early grades. A key term here, however, is the phrase "on average." Small class size does not necessarily guarantee better achievement in every class.

The data show that a majority of high achieving first grade classrooms were SAGE classrooms, but with respect to 1997-98 and 1998-99 first grade SAGE test results, a few large (Comparison group) classes outperformed the majority of the small (SAGE) classrooms. Nevertheless, when achievement data of the SAGE and Comparison first grade and second grade classrooms were examined over a two-year period, classrooms associated with the SAGE program consistently formed the majority of top performing classrooms. For first grade, a total of 84 classrooms were tracked (66 SAGE and 18 Comparison). Only one Comparison classroom ranked among the top 30 based upon student achievement across the two years. Fourteen of the lowest performing 33 classrooms were from Comparison schools. For second grade, a total of 74 classrooms were tracked (60 SAGE and 14 Comparison) over a two- year span. Of the top performing 30 classrooms over this period, only four were from Comparison schools. Nine of the remaining 10 Comparison classrooms fell among the 30 lowest performing classrooms over this same time span.

ANALYSES OF SAGE CLASSROOMS AND SCHOOLS 1998-1999

In this section the effects of the SAGE program on teaching, curriculum, staff development, and lighted schoolhouse services are reported. Data regarding the effect of reduced size classes on teaching were obtained from case studies and teacher and principal questionnaires. The teacher and principal questionnaires also provided data concerning curriculum, staff development, and lighted schoolhouse services.

Teaching

During 1996-97 and 1997-98 classroom events data were collected through classroom observations,

teacher interviews, teacher logs, teacher questionnaires, and principal interviews. These instruments revealed that the dominant characteristic of teaching in reduced size classes is individualization. When classes become small, teachers provide for individual student needs through one-to-one tutoring, small group activities, and total class instruction where each child receives attention. This increased use of individualization is occasioned by less time spent on discipline and more time available for instruction, greater knowledge of individual students, and more enthusiasm for teaching. Individualization along with a slight increase in the use of hands-on activities results in more and deeper content coverage which in turn, it is speculated, brings about greater achievement. The type of individualization that seems to occur, however, is more process than substance. Teachers basically use direct instruction methods to accomplish established grade-level curriculum.

In an effort to confirm and extend these findings, case studies consisting of more intensive classroom observations and interviews were conducted in selected SAGE schools in 1998-99. Also, the Teacher Questionnaire was given to all SAGE teachers and the Principal Questionnaire was given to all SAGE principals. These instruments present data on the classroom teaching of all SAGE teachers, as well as on curriculum, staff development, and lighted schoolhouse programs.

Case Studies

Portraits of teaching in the three different SAGE schools follow. The names of the schools, teachers, principals, and parents have been changed to protect the privacy of those involved. Although each portrait was prepared by a different researcher and, therefore, differs in format and style, common threads emerge which will be addressed after presentation of the case portraits.

The case studies were conducted in three SAGE schools each representing a different type of SAGE classroom configuration: 15:1 Regular, 15:1 Shared Space, and 30:2 Team Taught. In each school one first grade, one second grade, and one third grade were identified to receive special attention. Over the course of the year these classrooms were observed during reading and mathematics instruction four times, formally, and additional times informally. The observations were guided by previous SAGE classroom events findings, but the observers also searched for new events, practices, or themes. Also, over the course of the year, the teachers of these classes were formally interviewed three times and informally interviewed additional times. The formal interviews required the teachers to describe their teaching philosophy, teaching practices, changes brought about by SAGE, use of individualization, perspectives on previous SAGE findings regarding classroom events, and other teaching topics. In addition to these two types of observations and interviews, observations were made of selected school events and the principal and parents were formally interviewed. All interviews were tape recorded and transcribed, and all observation notes were transformed into expanded accounts.

Cleveland Avenue School: Shared Room Classes (15:1)

School

Location and Community

Cleveland Avenue School is a Milwaukee Public School located in a neighborhood with both advantages and disadvantages. The principal describes the neighborhood as "*a very nice area.*" Certainly, it's a bustling location with successful businesses nearby and lots of people out and about. The trees are old and tall, signifying the grace and age of the community. There are several parks nearby; on a nice day the children can walk as far as Lake Park, a huge grassy recreational area. In addition there is a good deal of elder housing around the school allowing the children's frequent participation in intergenerational

activities.

The biggest problem with the area is the lack of children living there. The housing near the school consists mostly of apartments and elder housing. Consequently, most of this school's children are bused in from other neighborhoods. The principal commented that, as a result, it's difficult for many parents to get to the school, even though, she said, most parents would like to be involved in their children's education.

School Characteristics

Cleveland Avenue School has been a part of this neighborhood for 150 years. The school itself is a very old brick building that has been painted white. It is surrounded by a fenced and paved playground that seems adequately sized for the number of children. Inside the school, all the classrooms and hallways are light and bright. Everything looks freshly painted and the halls act as mammoth bulletin boards, covered with posters and student work.

The classrooms are small compared to contemporary classrooms, and the SAGE classrooms seem especially crowded because they are divided between two teachers, each with 15 students. With tables, chairs, teacher desks, bookshelves the preponderance of learning materials (including computer stations) in each room, as well as the constant comings and goings of volunteers, student helpers, and other professionals, entering and exiting these classrooms is no easy matter.

The most obvious spacial constraint is seen in the library, located in the basement of the school. This is a typical, original basement with cement floors, small doors, and low-slung heating ducts. The library may be adequately equipped, but it is not much larger than a regular classroom and did not appear to be used often.

School Population

There are 16 regular teachers K-8 with the addition of 21 special teachers and 10 other professionals and para-professionals who deal with children. The school also has 2 administrators, a secretary, an engineer, a cook, and a nurse. The school has an ethnic mix consisting of African American, Hispanic, Caucasian, Asian and Native American students. The principal said, "*It's a very multicultural-based student population which gives us a lot of opportunity to be more diverse in what we teach.*"

School Philosophy

The principal and her staff, believing this was an "*outstanding*" school, got together two years ago to set a specific direction for the school. They wrote a grant to allow them to become an accelerated school. That plan, the principal said, was based on something she and the staff believed, that every child is gifted and talented. Their goal was to make Cleveland Avenue School the first choice of all students in the city and to retain their students until they complete the eighth grade. The principal said she wanted parents to say, "*Yes, it's an accelerated school; yes, it's a working school; yes, it's an accomplishing school and I want my child to go there.*"

The principal shared her views about SAGE participation, some of which are later reflected in the teacher interviews and observations. SAGE forces teachers to share their space, which is difficult. On the other hand, she said, it allows students to have more personal attention; in return, those students seem to have fewer discipline problems. In addition, SAGE brings teachers together. The principal said they can no longer go in their rooms and shut their doors; now they work together and collaborate.

Reduced Class Size Effects

Interviews with three teachers and observations of their classes in Cleveland Avenue School revealed four characteristics of small size classes:

1. high levels of classroom efficiency;
2. a positive classroom atmosphere;
3. expansive learning opportunities; and
4. enthusiasm and achievement among both students and teachers.

High efficiency in the classroom was the first noticeable effect of small classes. That efficiency was evident in teachers having broad knowledge of students, both academically and socially; in teachers having "easy" control of their classrooms; and in teachers' ability to work on several tasks simultaneously.

Classroom efficiency appeared to improve classroom atmosphere, evident in levels of compliance and comfort. The comfort level appeared to be true for students as well as teachers. Besides comfort, students appeared to be voluntarily compliant, a factor which was evident both in students' ability to remain focused academically for remarkably long periods of time and in their willingness and even eagerness to help each other learn.

Efficient classrooms with positive atmospheres appeared to provide students with expanded opportunities for learning. Many of those opportunities related to individualization that was apparent in one-on-one instruction and in small group situations. Teachers' conversations and classroom observations revealed a good deal of hands-on instruction that occurred with high levels of frequency, variety and availability. Content was reported to be increased both in quantity and quality, especially with emphasis on higher level thinking skills. The needs of special students were more likely to be met in these classrooms.

Efficient classrooms with positive atmospheres and expanded learning opportunities led to obvious enthusiasm and achievement. Not surprisingly, everyone appeared to be enthusiastic, teachers about teaching and students about learning. Both also appeared to achieve at higher levels. Teachers relayed remarkable achievement stories about students and also referred to their own professional growth resulting from teaching fewer students.

Classroom Efficiency

Knowledge of students. Teachers believed their teaching had changed in smaller classes because they were able to get to know their students better. *"I...take advantage of the opportunity to work with each student, find out more about them and they find out more about [me]."* Knowing students academically translated into learning advantages as another teacher explained. "*So every child I know a lot better because [I] can sit down and talk to them and get down on their level. [I'm] able to pinpoint the problems with students in their learning and work on just that one goal with them or two goals that they each need.*"

Knowing students also includes understanding their social needs. *"You know their home backgrounds, you know how they feel and what they think about things."* Another teacher gave an example. "*I had one [student who] had a really awful home life and was taken out of the home and I think she's now adopted. But when she came, she wouldn't talk. She wouldn't say anything. She couldn't write at all....These children are really, really needy.*" She went on to describe how she helps these children. "*They get a hug every day when they get on the bus, and in the morning when I pick them up, they have to give me a hug or I give them a hug....They really respond to that, even a smile, you know any type of affection.*" The teacher explained that eventually the young girl improved. "*Now she's reading on level. Writing is not*

quite there yet, but she's sounding words out...[She's] writing as well as my top child at the end of the year when I had thirty in a class."

Another student in the class also had home problems and cried a lot. The observer noticed him sobbing in the classroom, the teacher explained, "*This happens every day. We just ignore it until it stops. [To the child] Brian, go out in the hall.*" By the end of the school year, Brian's crying had stopped entirely.

"Easy" control. Teachers reported and observations revealed that control in a small class was relatively easy. This seemed to be the case for several reasons. Kids were more focused academically, a small group of students and one teacher could easily agree on what behavior is appropriate, there was tolerance for a wider range of behaviors, and teacher proximity acted as an indirect control.

One teacher explained misbehavior and class control this way. "*When kids disrupt, it is most likely because they're behind and not understanding what's going on so they have nothing else to do but bug everyone else around them. So [in a class of 30 students] you're always redirecting, redirecting, redirecting, spending most of your time redirecting and disciplining kids where you're not getting as much instructional time in.*" Besides being more on-task academically, she said a small group can more easily agree on what behavior is acceptable. "*I get them adapted to my procedures right away, stopping any difficulties. I'm right here so they know very quickly how I run the classroom and eventually we will run the classroom together. Their style will change it.*"

Acceptable behavior in a small class appeared to cover a wider range of activity than one would expect in an average classroom. Asked why this was so, one teacher explained, "*Basically, when you've got 30 in a room, they stay in their seats unless they raise their hand and have to sharpen a pencil. With 15, I have reasons for them to get up and move around.*"

Observations supported the idea that teachers were very tolerant of unexpected student spontaneity. In many instances, students were encouraged to shout out answers, and sometimes teachers were able to respond to each student. During a delightful hands-on activity with M&Ms, first graders fully enjoyed themselves. Throughout the activity, students talked out loud, commented to themselves, babbled, and chanted little rhymes. One boy was full of rhythm, hands in the air, feet tapping, bouncing in his chair. Even when he began tapping his fists on the desk, no one seemed to be disrupted, or for that matter, even noticed.

Summarizing a reading activity in the same room, the observer noted that students in the room are allowed every opportunity to act naturally and be themselves. When they feel the need to walk around a little, they are up and about. Maybe they read for a while at the windowsill, standing up. When one student wanted more privacy, she pulled her desk away from the others. In fact, every day in this class, the desks seem to be arranged differently. Students are also free to read with anyone they please. Once the teacher asked a student to pick someone new when it was time to read, but otherwise students were free to associate and read with whomever they chose. These children appeared to be more receptive to learning than if they had been confined to their seats in a class of 30 students.

In small classes, there appeared to be very little direct control of students. One teacher said, "*[Students] feel more control of their room rather than me controlling them.*" In fact control is so subtle, it is hard to identify. All the teachers described control similarly. One teacher said, "*And the discipline, obviously, you're right there with all of them. They aren't going to have a chance to act out.*" Another said, "*Before [I] took a lot of my teaching time with discipline problems. Having 15, I'm so close to them. Generally, I don't have to say a thing; I just look at them and they shape up and get back to work...So I don't spend a lot of time with discipline anymore.*"

Teacher organization. Efficiency in the classroom, besides stemming from teachers' knowledge of students and "easy" control of the classroom, was evident in teachers being able to accomplish a number of tasks simultaneously. One teacher explained, "*I try to respond when they need help; I try to respond right away when I can. So sometimes I'm doing two or three things at once.*" Consequently, teachers felt they were more organized, students spent more time on task, and students got more help from teachers.

Organization was evident in situations such as initiating a project. Contrasting the mechanics of doing an art project with a regular class to doing that project with her 15 students, one teacher explained, *"[In a large class], if you passed out all the materials right away, you would have 20 kids acting out over there. [Here]...I can set it up as I'm explaining and as we're going along and we're all doing everything together."*

In other instances, except during direct instruction, teachers were doing several tasks at one time. One teacher agreed when the observer commented that she was doing all kinds of things at one time. Kids were coming and going while she collected field trip money and also marked down the names of kids who did not get stickers on their papers. Furthermore, it did not seem confusing to her. Another teacher made a habit of pulling up a chair next to any student who needed help, all the while fielding questions from the class while she performed some other task such as counting the lunch money. It was common procedure in another class for students to show the teacher their papers while she was also conducting a reading group with a different set of students. When asked to comment on her ability to manage multiple student projects occurring in her room simultaneously, one teacher responded, *"I don't know if I'd necessarily be able to do that all the time with a group of 30 to 32 kids like regular classes have. I'd probably be exhausted. And I don't know how much you'd get accomplished."*

All in all, there was marked efficiency in these small size classes. That resulted in teachers being more organized, more relaxed and energized to teach. In the same respect, children were understood by their teachers and seemed to thrive in an environment without direct control where they were comfortable and be able to be themselves.

Positive Classroom Atmosphere

Without question, increased classroom efficiency contributed to a positive classroom atmosphere. In a room where students were well understood by their teachers, where control was "easy," and teachers were organized, everyone seemed very comfortable. In addition students seemed to be voluntarily compliant. Students demonstrated voluntary compliance in two ways: first, they appeared to be independently focused academically, and secondly, they were willing, almost eager, to help their fellow students.

Comfort level. "*With 13 kids, [school] is a lot more manageable and I'm a lot more comfortable.*" The comfort level of students and teachers was a dominant feature of SAGE classrooms. Teachers referred to it as both an interpersonal characteristic and also a physical characteristic. "*Basically, the children...feel comfortable coming to me and ask me how to do things...I take my time to work with them.*" Comfort also meant proximity with students.

> *"When I'm sitting down with them at their level, they don't see me standing over the top of them. Some kids get intimidated by that, so I always have an extra chair at each table and I sit down with them at their level. I think they feel more comfortable and they open up a lot more...They like...being seen as an equal....They still see you as an adult, and they respect you as an adult, but they see you as...more understanding....I feel it's more respectful because I know I wouldn't want to be stood above....If I don't want it, I don't want to do it to my kids."*

The comfort level of teachers influenced their role in the classroom. Explaining that role, one teacher commented, "*I walk around and say, 'Now, does this look right?' I'm more of a guider.*" Observations also showed how comfortable teachers create happy learning experiences. In one instance, the teacher was directing a reading lesson with students reading individually when she stopped the class and made a comment in a way that made the students giggle. She began laughing with them. When the students resumed reading, the laughter started up again and the teacher laughed along with the students. Seizing on the opportunity to have some fun, the teacher pulled out a reference book and showed pictures which made the students laugh even harder. Later, when asked to comment on the incident, the teacher acted like it happened all the time and attributed everything to the fact that the book was funny.

Students' Voluntary Compliance. In small classes, students appear to be voluntarily compliant, a quality which probably results from being well understood by their teachers and from learning in an organized, non-authoritarian classroom where everyone is comfortable. Compliance was noticeable in two different kinds of situations. First, students appeared to be very independent learners who could remain focused academically for remarkably long periods of time. Second, students were willing, and in many cases very eager, to help their classmates learn.

Teachers say that in large classes, kids tend to loose focus; however, in small classes, teachers are able to train students to stay on task. "*I've taught them to be independent workers and not just come to me as a resource.*" She impressed upon them that they are a team and it's just like work. If one person messes up or gets out of line, the entire group suffers. That one mistake makes a problem for the entire organization or project.

Two specific examples pointed this out. In a second grade classroom, students had been working an entire morning of academic work. Yet, students remained very focused. Even after several hours, students acted as if they not only liked to work, it never occurred to them not to work. All morning they were on task and obviously learning. The teacher commented later keeping 30 students focused for that length of time would have been impossible. She said that only in small groups are second graders are able to work like this.

Similarly, in a third grade class, students worked steadily on a long project without any prodding or reminders. Usually one student in each of five groups read while others followed along. As they read, they asked each other questions and completed parts of their worksheets. When asked why the project went so smoothly, the teacher said that no one disturbs or bothers anyone else. The students are 100% comfortable with each other. The teacher went on to say that she could leave the room for a long period of time and these groups would continue working on their own. Overall, these students were lively, happy and moving around most of the time, yet they always appeared to be on task.

The first grade teacher said student compliance was also evident in homework and attendance.

"*[My students] are all doing their homework at night [and] bringing it back. When I had a large class, I had one or two or three that would bring it back.*" *[SAGE also improves] attendance because the kids love being at school. In fact, they're always saying to me, 'Do we have school tomorrow?' 'No, it's Saturday.' 'I don't wanna be home. I wanna come to school.'...They really like school because they get the extra attention.*"

Students also appeared to be kind to each other and liked to help each other out. Teachers described circumstances where children wanted to be sure their friends understood the material. "*I have one little girl; she'll feel bad when her friend doesn't know. She'll show her how to do it.*" Another teacher summarized students' care with each other comparing her class to a family.

> *"These guys are so much of a family and are so nice to each other and work so well together and accept it if someone is a little bit lower than them. They help them out. They're just so loving. They're a wonderful group of kids. So, socially, they've really learned, not only in my classroom but outside. If we go walking on a field trip...the people will [comment], 'They're so good; they're so nice together, so nice to each other.' It's wonderful."*

Expanded Opportunities

Small class size led to more learning opportunities for students. These opportunities came in the way of individualization, hands-on activities, the quantity and quality of content and in the meeting of needs for special students.

Individualization. Teachers were unanimous in believing that individualization was the main effect of small class size. One said it accounted for 80% of the difference. But individualization referred to at least two different things in teachers' conversation. Either it meant working one-on-one with students or meant small group work, both of which allowed for improved levels of student participation.

Regarding working one-on-one with students, teachers saw it as an effective means for remediation. One said it was the big thing helping her right now,

> *"I can get around to each child, even the children who are real quiet. Usually [in a large class], you have problems getting to them. These children, I mean, I get to see them two or three times each day and work with them individually...That's the big difference....I have several [children who] did not go to Kindergarten....and I try to read with each one of the four at least a few minutes every day by themselves....and I choose two or three of the other students each day [too]. Another teacher said, "I don't want to leave without them mastering the unit...They weren't getting it with the whole group. I still have two that I have to further work with...but I just keep giving them individual attention."*

Others saw one-on-one individualization as a way to break away from old habits of direct instruction.

> *"I get them all up close a lot of the time or I'm right down there with them at their level...Before SAGE I did a lot of direct instruction to make sure I could always see all their little eyes...Now I do my five-minute spiel up there at the board and right away they're all into it and I roam. All the time....[since SAGE] I can break away and get hands-on with the kids and have fun with it."*

Teachers felt that the break from direct instruction was important for some children.

> *"This little girl over here that I was mentioning doesn't learn well from direct instruction so you have to resort to hitting every learning ability and [each child's] way of learning in your classroom. Direct instruction isn't always the way to get at that. I know I don't learn that way. I'm very bad. If someone's doing direct instruction,...I don't learn that way....A teacher needs to know that not every child is going to learn that way. We have to hit all the different types of learning."*

One-on-one instruction in small classrooms also provided some important attention to learning detail which might not occur in a larger class. One teacher said

> *"Each kid gets an opportunity to respond." For example, in a second grade classroom, it was*

> *time for students to tell about their pictures. Each student rose from the chair and pushed it under the desk. Then, standing and holding their drawings, students told their stories. When one girl said, over and over, "she got....,she got...,she got...," the teacher corrected her very softly until the girl was saying "she has..." each time. When the next student rose to tell her story, she said, "she got..." and another student quietly said, "she has..."*

While all this was happening, the teacher was also taking notes on each speaker. She explained later that the notes she was taking were questions she was going to ask the students later about their pictures. She said with 30 students, that individual attention would not have been possible.

In another instance, two students disagreed about the cause of the major problem in the first three chapters of their text. The teacher gathered the two around her and asked each girl to state her opinion ("*without mumbling, please*") and then insisted each defend her idea. Overall, one-on-one instruction and attention was an important theme in all three classrooms.

Individualization also meant utilization of small groups. Teachers were adamant about the importance of being able to divide children into groups for instruction. They also defended the practice of ability grouping for reading.

> *"We have all the kids in groups so they're being challenged. They feel comfortable with their group because they know that we all have problems and...they fell comfortable reading or expressing themselves. They don't have to worry about someone seeing them mess up. [Kids who are little below reading level do not have to] worry about more advanced kids looking at them, tired that they are taking so long. [Those kids will be] reading ahead and turning the page. So these kids are comfortable with their group, doing their work, but still, they...are being challenged."*

In other situations, teachers described grouping children according to ability so that achievers could help non-achievers. "*One boy in my [third grade] room has Kindergarten skills. I have him work with one of the most advanced students because he keeps the other boy from falling behind.*" In addition, children were grouped according to personalities and particular skills, depending on the tasks to be performed by the group.

In all cases, the size of the class determined that teachers were able to group children.

> *"If I had a class of 30, I wouldn't even be able to move those groups apart like that....Even when I did my first year of teaching [with] 30 fourth graders, I couldn't do two groups The kids that did know the work...would have to [be monitored] so much, I wouldn't get a chance to teach that [other] group. [Today] I told the kids to go in the back and play the game and they were able to do that."*

Hands-on activities. Teachers felt that hands-on activities were important to children's learning. Their description of hands-on included all learning which did not take place with books and papers at students' desks. They were proud of the variety and frequency of these activities.

"*Usually I [use hands on] two or three times a week or more,*" commented one teacher. Another said, "*We use manipulatives every single day.*" The first grade teacher said she used manipulatives to start each unit. "*Whenever I start a unit, I have an overhead and I [use] the overhead and they work with theirs at their seat, with their manipulatives. She mentioned manipulatives such as cubes, wooden blocks, cereals, vegetables, and money.*"

Other examples included the use of lot of maps, taking a full year to plan and act out a play, going down to the library researching, getting on the computer, finding something on the internet.

Teachers emphasized that much of that activity would not have been possible with a larger class. With a class of 30, "*I wouldn't even have enough counters! Furthermore, with a large class, you might be able to do that but it would be much slower.*" Another said, "*In a large classroom, you had to watch those children, especially first graders, because the hands-on stuff would be all over the room.*"

Giving an example, one teacher described a typical small classroom situation, "*So if a kid asks a question all of a sudden, I just go click it in and it's right there right up on the TV screen so they can all see it...With 30 kids in the classroom, they wouldn't sit quietly while I typed it up and got it up onto the TV screen.*"

Content Quantity. Teachers did not hesitate to mention the possibilities of getting more deeply into content as a result of smaller class sizes. They explained that students have more opportunities because they can research while the teacher is working elsewhere in the classroom. They can use the computer or the library, both of which are more available with fewer students. In addition, there are more opportunities because students have more freedom to move throughout the room and the school. Teachers said they finished up things quickly, at a faster rate, so they could plan additional activities, especially fun, hands-on learning and reinforcement.

In one instance, second grade students were reading and one student sounded out the word *appendicitis.* Quite spontaneously, the teacher pulled out a reference book to show them where the appendix is. All the students stood up and leaned to the center of the table as the teacher explained the food process through the body and where the appendix was in that picture.

Content quality "They're doing work to learn". Teachers described improved curricular content in terms of the number of complex projects they were able to initiate. One teacher described special projects on ethnicity she was able to do with her small class, six in all, far more than she would be able to do with a larger class. During a reading class, a first grade teacher had each of her students read word lists individually. She had each student read an entire list of words individually. The teacher explained that in a normal class that would not be possible. "*It would take me two or three times that amount of time to get through the word list. The children loved it and when it was over, they wanted to do it again.*"

Another teacher described how she broke down each novel into activities for groups in her class. "*I have one group who are story reporters who...[do] a story map, a story web on those three chapters....Then we have the chapter performers [who] perform two or three pages out of that chapter....I have the novel enrichers [who] have a choice of things they can do...researching....We have the vocabulary finders [who] go through and find words that they don't know...define the word, [etc]....So we do those kinds of activities throughout the year on chapter books.*" She added that none of the worksheets were book-specific, rather they were designed to be used with any chapter of any book. The groupings taught kids to be independent, provided beneficial pairings between students, and added advanced skill development for third graders.

Another teacher said her class was going to put on a play. "*With 29 kids, it's hard to put on a play with your class. Now with 13, we're going to perform a play towards the end of the school year; we're going to start now...We aren't going to have kids left out and not get a part in the play. It's easier to manage the 13 kids who are going to put it on [at different times and in different places throughout the school*]."

Improved curricular quality was evident in the emphasis on higher level thinking skills throughout the work in the three classes. The first grade teacher explained that when she had a large class, she taught the whole group with direct instruction most of the time. "*But then I had my reading groups. [My other students] did a lot of writing from the board, filling in blanks, that type of thing...basically, I had to keep them busy while I was teaching the groups...Here...they're really not doing any busy work; they're doing work to learn.*"

Higher level thinking skills were also evident in the questions teachers asked. They were open-ended questions asking children to really think hard. "*Now what is the problem? What has happened so far in the story? Is that a big event or a small event? What is the problem of the book? So all the big events surround that big problem?*" In another class, the teacher asked, "*What kind of slogan could be used to advertise that character? What is the biggest problem developing in these three chapters?*" Teachers were inclined to ask challenging questions and were patient waiting for each child to think through the questions and respond.

Beyond challenging the class as a whole, teachers worked to address each student's ability level. "*Since the first day of having a SAGE class, I've always advanced the advanced kids and tried to pull up the others.*" This was a new concept for her when she began teaching a small class. "*I didn't have time with 29...It's sad to say and I don't like to admit it, but... some [did] get lost.*"

Teachers described adjustments they made in their teaching so that all students' needs were met. "*It was easier to find stuff for the lower kids, but it's hard to figure out how to challenge the higher kids. That was my weaker point. [The student's] mother and I sat down and we talked about it and I've been able to let him build off that. He enjoys writing books so if he finishes he can go and research and write a book.*" Another emphasized the extra effort that was necessary. "It's double planning, but it's O.K. because otherwise you're sitting there watching some of the kids who are so bored. So it's challenging but it's also rewarding.

Special Students. Several types of special students appeared to benefit from small class size. Children from disadvantaged backgrounds were given special help, and other children who showed special education tendencies were spared from being labeled at an early age. Even children who had already been given labels were able to spend most of their time mainstreamed in SAGE classes. All three types of children appeared to achieve at a high level in SAGE classrooms.

One type of special student consisted of children who had not experienced Kindergarten. The first grade teacher referred to several of those students who were new to school. She said they had made tremendous progress. "*I'm really pleased with them....I have more of a chance to help each child....I try to read with each of the four at least a few minutes every day by themselves." [One of those students is] really gaining speed and should be close to grade level by the time she leaves here.*"

Other children seemed destined for exceptional education programs but were withheld from testing and placement because of their small class size situations. Teachers gave several examples. "*I did have one kid where the parent thought that at another school her child should have gone LD. But I didn't see it in that child....This year he's on level and reading....His mother noticed he was doing much better [and] she was really happy.*"

In the second example, a teacher talked about a child who could be labeled emotionally disturbed.

> "*But if we did label her she would have to leave our school because [she would be] put in the emotionally disturbed room...and we don't want to hurt her socially. But because of my small*

classroom, I'm able to keep her in my room, give her the structure that she needs, and help guide her along. Now if I had a group of 29, there'd be no way. We'd test her, get her the help that she needs in a different classroom because [she] would disrupt my class....I just keep going back to the ED teacher and asking her for advice and working with her alone in my classroom."

Another teacher described a child with severe ADHD and mild ED tendencies. "*We haven't labeled her because small class size has allowed her not to be labeled because she does get her focus and attention. We know when she gets up to fourth grade, there's going to have to be a separate IEP made out for her because she is going to be lost. We know she's going to be lost. [If she could stay in a small class] she'd be fine.*"

Teachers also told about children who had been identified as having exceptional educational needs but were being especially well-served in SAGE classrooms.

"SAGE does allow for exceptional education kids to be reached and you see a greater growth in exceptional education kids...Even emotionally disturbed children tend to act out less in the smaller class size than in a regular classroom because ...there's more guidance from the teacher, less opportunity for other kids to act out and set off that child."

Teachers went on to say that LD children normally are a year and a half behind. The three LD children in third grade were almost in SAGE classes at grade level or even above grade level. "*Even your so-called 'label' children show in their re-evaluations that they have made a greater leap because of the small group, one-on-one contact.*"

Enthusiasm and Achievement

The result of having efficient classrooms with a positive atmosphere and more opportunities for learning was evident in the enthusiasm and achievement on the part of teachers and students.

Enthusiasm. The spontaniety in the classrooms was obvious from the observations. For example, in a first grade class, students clapped when their teacher finished reading a book. In another situation, students leaped from their desks almost before the teacher finished giving a math assignment. Students ran to their partners, grabbed meter sticks and began hustling around the room doing their activities. Everyone was involved and active, talking, thinking, debating and problem solving. Students were learning and were very excited about it, expressing their enthusiasm without inhibition

Enthusiasm on the part of teachers also seemed to be a product of small class sizes. One teacher explained the importance of that.

"If the teacher isn't excited, the kids aren't going to be excited and they aren't going to be learning." Besides helping kids, enthusiasm helped teachers. "When you're a first grade teacher...it's so exciting, especially in the spring. When you set back and listen to your kids read and watch them do the math, you just get goose bumps all over. Having the 15 makes a tremendous amount of difference."

Another teacher told how class size affected her even when school was over for the day.

"I used to go home and I'd be so frustrated because there'd be one or two children who needed my help or needed to talk to me and I didn't get around to them until I was driving home and I'd remember that I didn't find out what they wanted. And so I'd be really, really upset with

myself. It's really stressful, not necessarily during the day, but thinking about what I didn't do...Now I get around to all the children and I feel more relaxed when I leave here and I feel like I'm doing a much better job and the children are learning much, much better."

Achievement. Teachers relayed many stories of SAGE students' achievement. They said their students generally finished the year in reading books above grade level, and they seemed to be ahead of non-SAGE children in other skill areas, such as writing and work skills.

All teachers reported that their children were reading above grade level. At the end of the school year, for example, a third grade teacher said that she had only two students reading at grade level, and because of SAGE, everyone else in the class was reading above and beyond the fifth and sixth grade level.

Teachers also described characteristics of SAGE students not related to reading. One teacher said that the difference between SAGE kids and non-SAGE kids in the classroom is the quality of the work. *"I could go on and on about some of the [other] kids. They are not on reading level. They don't have really good work habits."* She also said that attendance is not a problem with SAGE kids, but kids who come from other schools, even if their ability level is high, have poor attendance and poor work habits.

A first grade teacher was impressed with SAGE children's ability to write. *"I mean...you can't believe how adept [SAGE kids] are in writing. I just got a new student in from another city in Wisconsin; he's supposed to be like their top student....He doesn't know his vowel sounds...My children are far ahead of him."*

Non-SAGE students needed a lot of individual work to keep up. *"I keep giving them individual attention...[They] don't have the necessary skills to...begin with. So I have to keep going back and redoing."*

Generally, teachers believe SAGE students can and will surpass other students as long as they are in SAGE classes. *"I tell parents if you have a child in a SAGE classroom, you can expect a lot from that teacher." Teachers believe those students "should never be behind again...Hopefully, they will continue to be challenged and the teachers can find time to continue to challenge them."*

Teachers were interested in the effects of SAGE and felt they grew personally because of their involvement in the project. When presented with a model of the classroom process and effects based on results of the first two years of SAGE, teachers spent a good deal of time studying the model and interpreting it. Overall, they were impressed with its accuracy. One teacher exclaimed, *"That's it. That's exactly what we're doing."*

Teachers also believed that they had achieved professionally as a result of smaller classes in becoming better teachers. They said they saw professional growth in themselves, first in learning to individualize and then in using those skills at a classroom level. All agreed that they grew gradually in their ability to individualize and that over time, it became easier. *"I think [my individualization] started right away. I noticed that some kids needed more, and...by the second year...I knew I could challenge them more....This year...I knew exactly what I should be doing with them."* Teachers also reflected on the outcome of their personal growth. Determining that she was now able to challenge the needs of high students and low students simultaneously, one teacher saw all the students achieving and said to herself, *"Wow, last year at this time I wasn't doing this with any kids!"* One teacher said she noticed gradual development in her ability to individualize, that it became easier for her, especially with lower students.

One unexpected outcome of SAGE classrooms was teachers' freedom to leave for a day or two for

professional development. One teacher said she determined that her spelling curriculum was not effective because it was not showing up in students' writing. So, she attended an inservice to learn a whole different spelling curriculum. She said that she was comfortable leaving her students with a substitute teacher, unlike when she had 29 students. "*I hated leaving them because you always came back and heard about how awful they were. This didn't get done and this happened.*" But with 13 students, she was able to leave for a couple days. As a result, she will initiate a new spelling program. "*It's not going to be hard...with only 13 [students]*."

Parent View

Janet Simms, a parent of a 17 year old and a 9 year old, talked enthusiastically about SAGE and Cleveland Avenue School. Janet is involved in the school as a board member and a volunteer mother. The 17-year-old came to Cleveland in the fifth grade. The teachers brought his grades up and his self-esteem up so that he eventually became an honor roll student. His whole attitude about life changed, and she believed it was the staff of teachers who made him feel that way. His teacher did have 30 students in the class, but she was very strict.

Janet's younger child is nine and has been in Cleveland Avenue School since Kindergarten. He's in third grade now in the SAGE program. She loves it because the teachers give the children the message that they are important. With the SAGE program, with a ratio of 15:1 or less, there is a family atmosphere.

She said one advantage of SAGE is that children can speak what they feel and they don't have to wait so long to speak. There are many advantages of "little people" being able to speak more often. Sometimes, they come to school feeling bad about problems at home. Maybe a parent is stressed out, maybe there's an illness in the family, maybe a divorce. A lot of things can go on in the family. Sometimes those children come to school very sad, but if they are in a small class where there is someone to listen, they will probably walk out of school at the end of the day with a smile on their faces. Because of the SAGE program, the teacher has time to listen. That's important for little people. This experience when they are very young will have an impact on their lives. Those first few years of life makes people who they are; it's a time to bring out the most valuable parts of the inner self.

Janet's son had learning problems because he didn't hear for the first year of life. He has made enormous progress at Cleveland Avenue. He started at a very low reading level, at least one grade behind. Now he's in third grade and he's gone beyond third grade, almost a year ahead. They say he has knowledge at an eighth grade level. Janet believes that happened because teachers were willing to listen and hear him talk. She said teachers have a lot of time for parent contacts. She gets lots of calls because her kids are doing something very well in school. Teachers seem to have a lot of time to get to know parents and also kids see their teachers as confidants.

There are more opportunities for these classes, too. As a parent volunteer, Janet's gone to St. John's with classes, to the museum, to Discovery World, and to IMAX. She said they take walks to the lake so they can see the beauty. A lot of kids don't take walks at home because their neighborhoods are not safe or their parents don't walk. But here they can do that. Their third graders were able to see what it's like to go to college. This kind of activity contrasts with her other son's experience in another school where they didn't take any field trips.

She said it will be difficult for her child to adjust to a large class size, but he will carry on with relationships and skills he developed in SAGE classrooms. He probably will go back to his former teachers because he knew he could talk to them at any time. He learned interpersonal skills in the early years that he probably will be able to use in the upper grades.

Janet stresses that she owes so much to SAGE. A really good school and small class size, she said, makes little people good people. She suggests "SAGE kids" will be different as adults. "*Watch them in the future; there won't be as much violence in their lives. They learned how to care for each other, how to express themselves, how to control anger. These things can all be taught in a small class.*"

Meadow View School: Team Taught Classes (30:2)

School

Location and Community Description

Meadow View is part of the Milwaukee Public School system (MPS). The housing on one side of the school appears to be predominantly older, lower middle class single family homes. Two churches, one of the churches with a school, are found nearby. A new subdivision consisting of attractive, midsize single family homes is being developed. The residential community with spacious yards to the north and west of Meadow View does not give the impression of what one expects of an urban school environment. Indeed, across the street from the school's main entrance, a hayfield extends a rather spacious non-urban view. Behind the school and to the south of the school, the view changes to one of older homes with smaller yards, duplexes, and other apartment-type homes. In general, this area of the community exudes a lack of care or homeownership when compared to the single-family homes that dominate the north and west side of Meadow View.

School Appearance, Architecture, and Condition

The main part of the school building is constructed of lannon stone with some additions to the original school structure consisting of yellow brick. A large lawn covers the front and the north side of the property. To the south of the building is a parking lot. The playground is behind the building. Overall the school appears to be an older structure which is confirmed when entering the building, walking down the halls, and visiting classrooms (probably 50's). The building is an older construction, but no immediate disrepair or neglect is noted. As indicated in the MPS School Selection Guide. the school is wheelchair accessible and offers services for the orthopedically impaired. Some classrooms, the library, cafeteria, and the gymnasium are located in the basement. The halls appear crowded with chairs and tables and abound with colorful student work which includes posters, artwork, writing, science projects, and other projects. Groups of students and their educational assistants work at tables in the hall on a regular basis. Space is at a premium at Meadow View. The school does not have a music room or an art room. Music and art are taught in regular, grade level classrooms. Teachers and their equipment travel to the individual classrooms when specials are scheduled. The teacher's lounge is small, and staff meetings are held in the gymnasium. Crowded conditions are also noticeable in classrooms. Teachers speak of congestion caused by a high number of students, two teachers, equipment, and materials making their home in a classroom too small in size.

Student Population

Meadow View's total enrollment is approximately 520 students in grades K4-6. About 85% of the students are considered minority students. The principal estimates a student mobility rate of up to 45% in the course of a school year. About 70% of the students are bused to Meadow View according to the principal. Parent SES is assumed to be low as to be in compliance with SAGE SES requirements.

Type of SAGE School and Staff

Meadow View is now in its third year as a SAGE school and is considered a 30:2 team taught type of SAGE school. For Meadow View's teachers, SAGE has therefore become synonymous with team teaching. In the MPS School Selection Guide, Meadow View is described as a regular elementary school with a traditional basic skills curriculum, a modified Program for the Academically Talented and a focus on preparing children to become lifelong learners. Meadow View's teaching staff consists of 29 teachers in self-contained classrooms, four special education teachers, two administrators, a social worker, a psychologist, a guidance counselor, a half-time librarian, a Title 1 resource teacher, and three teachers in the specialty areas of art, music, and physical education. Educational assistants and volunteers regularly assist teachers. A visitor to Meadow View cannot help but notice the large number of volunteers working with students in the halls and classrooms at any given time. When asked how he gets volunteers for Meadow View, the principal stated that all he has to do is ask. Retired Meadow View teachers return on a regular basis to help out and so do community members, parents, and students (middle school and high school) who are involved in the Responsive Schools Project. One teacher's mother, for example, is a regular helper in the third grade classroom. Grandma, as the teacher's mother is generally referred to, enjoys volunteer work with children. Volunteering at Meadow View is particularly enjoyable, she states, because the principal is so accessible and easy to talk to. She feels that he appreciates volunteers which has not always been her experience at other MPS schools.

Principal Interview

The principal has been in this leadership role at Meadow View for seven years. He tells his teachers that he has high expectations and high standards for students. And although Meadow View's students' test scores do not reflect high achievement at this point in time, it is his goal to have Meadow View's children as well prepared as any child attending any school, private or public. During an interview, the principal made the following comments about the SAGE program at Meadow View:

> *"The SAGE program itself has changed a lot here at school, it has people work more as partners, more as team members, working together as opposed to individuals. I think that is very important. The SAGE program has also helped us to support and maintain our community ...with before and after school programs. Because of the SAGE program there are many more things that we can do; it services the parents and also services the children and that is due to the program. Overall is has affected the students and students' achievement; our students are doing better since we have the small ratio of student to teachers. And I think too that the program will be a lot better if we could deal with one of the problems we have here at Meadow View. We have, I could say a negative ..., and that is our mobility rate. We are not showing a growth that I would like to see, and I think that is because of the high mobility rate. If it was a little bit lower, I'm sure that we would have much more substantial growth."*

The high rate of student turnover, the principal points out, has a negative impact on the SAGE program because the school often does not "*get a chance to get a child from kindergarten that goes all the way to third grade.*" He does not anticipate any major future changes as a result of the SAGE program but would like to see SAGE extended to include all of the grades at the school. SAGE has had a very positive impact on Meadow View, and some parents, the principal notes, who had left the district, are coming back because of the SAGE program.

Teaching

Three classroom teams at the school were studied since Meadow View has a 30:2 team taught type of SAGE program. A first grade, second grade, and third grade team were selected using SAGE evaluation

data from previous years and input from the school's principal. The first grade teacher team, Team One, consists of two male teachers now in their third year of team teaching in the SAGE program at Meadow View. The second grade team, Team Two, has a female teacher who had previously taught a first grade SAGE classroom at the school and a former male fourth grade teacher with no prior experience in the SAGE program. The third grade team, Team Three, is made up of two female teachers new to both SAGE and Meadow View.

Teaching experience for the teachers on Team One, includes eight years of teaching and a recent Master's Degree for one of the teachers and 14 years of teaching experience for the other team member. For Team Two, one member has 14 years of teaching experience and two Master's Degrees; the other member has 17 years of experience and is currently working on a Master's Degree. Team Three consists of a teacher with 22 years of teaching experience and three Master's Degrees and a teacher with 9 years of experience who is also working on a Masters' Degree. All teachers have been involved in continuing education course work and inservices. However, none of the course work or inservices related specifically to small class size teaching.

Team One's philosophy is guided by high expectations for all students. Team One teachers believe that all students can learn and having fun while learning is important. The philosophy that guides one of the team members of Team Two can best be described as life-long learning and to have fun with learning. The other member believes that all students can learn; it is just a matter of figuring out the key to each child. Team Three's philosophy emphasizes high expectations for students and parents. Recurrent themes evident in all three teams are high expectations and the belief that all students can learn.

Changes Made and Anticipated.

When asked to describe major changes in their teaching as a result of the SAGE program, teachers of Team One noted that they have more time to prepare better for their students, to do more hands-on activities, and to teach in small groups. One of the teachers observes:

> *"I mean before we were really unable to do that at all and I think a small group is, to teach a small group is a lot different than to teach in a large group. Uhm, a lot more hands on things, you know, more activities because there is always that extra person around to help with kids who are having difficulties."*

A teacher on Team Two notes *"The biggest change for me that I can see right now that I'm going to have lots more energy, lots more energy. A lot more energy to work with students on a one to one basis."* For Team Three, teaming is a new experience, and change for them means also adjusting to team teaching. Both teachers also observe that they have more energy and can do more because they do not "*get as personally drained*" now that two teachers are in the classroom. Generally, teachers agree that they get to know their students better, can assist students more frequently, and are able to cover more content. During an interview, a teacher on Team Two makes the following comments:

> *"Well, I think, the major change has really been that we are able to reach students. I noticed that before we had SAGE, I think, I taught well then, but it took me a while to know each student. Maybe a month before I probably got to know how they reacted, what triggered them, what turned them on educationally. Now because there are two of us in the classroom, we are able to get around to each student for more personal time, and so we are learning the students' personality and their goals much quicker than before we had the SAGE program ....we always had a pretty strong curriculum. I just think that we are doing a better job at, ah, with the curriculum. We can actually do more than we were doing before. ...students are working more*

rigorously now, and where we weren't able to meet some goals, we are getting closer to that now."

Teachers did not indicate any major changes in teaching style as a result of the SAGE program. One teacher noted that having a teaching partner has made him a little less rigid and more open to working with small groups. Another teacher, now in the third year of SAGE, described the teaching style as *"...pretty much what I've been doing all along, it is just a matter of working with your partner and being flexible and team teaching. I've been doing it for three years now; I'm pretty much in the mode of it."* Two teachers indicated no change in teaching style. When asked specifically about the use of direct instruction in their classrooms, the teachers generally indicated that they still use direct instruction but less of it. They report that they can do more experimenting with activities and have more flexibility to do other things like small group instruction. "*Well, I still do use direct instruction myself too like I have in the past. I just think it's probably changed in the sense that maybe I don't have to do as much direct instruction ...*" observed one of the third grade teachers.

In sum, what can be considered the most significant change as a result of the SAGE program to classroom life is described by one of the experienced SAGE teachers as better learning opportunities. A Team One teacher states *"...so I think it has opened up a lot of opportunities for us and the students to learn better."* Better learning opportunities in a SAGE classroom are described by another Meadow View teacher as opportunities for active and engaged learning rather than busy work:

"I think that one of us is, you know, talking or engaging the kids, or the kids are talking, engaged in active learning of the lesson more than here you have this, do this 45 minutes or whatever .... one of us, it seems, is always talking or saying something, you know, so and the kids, I think, then they are more alert, and they are more engaged that way."

Reduced Class Size Effect

Better or increased learning opportunities in SAGE classrooms may be attributed to better knowledge of students, more individualization, fewer discipline problems, and more content coverage and hands on activities. These perceived effects of the SAGE program were noted frequently by the teachers in this case study.

Knowledge of Students

Teachers generally report that they do know their students better and that it takes less time to get to know them. While knowledge of the students' personal life is important to the teachers and more opportunities are noted for gaining such knowledge, teachers seem to place an emphasis on knowing an individual student's academic performance level. One teacher states that *"...before I had SAGE, it took me a while to really figure where someone actually was because you have so many children. And by having two of us, ...you are able to see who needs help with maybe some skill of reading ..."* Another teacher comments "*So I think having two teachers in the room really helps you know how well each child is doing.*" Teachers seem to use the more in depth knowledge of students' academic levels to provide more individualized learning opportunities.

Individualization

Case study teachers institute individualized learning opportunities in different ways. Team One, for

example, uses small groups and educational assistants to individualize or "tailor" instruction to the individual academic needs of students. Three educational assistants work with small groups (1-5 students) of students for one hour on a daily basis. The teachers describe how they individualize:

> *"I don't know the word individualize is exactly what we've got. We started like you said with more of a small group. I guess "tailor" is a better word for us. We're tailoring the way we're instructing to meet the needs of certain pockets, I guess that we see. Uhm, and right now we're going to focus more on that middle 50 per cent, that's where we're gonna devote most of our energies because they've already kind of got a good base going. And those are the children we feel are going to learn the most even from the individualized instruction. Uhm, so they're going to get the majority of that individualized time. The children who are in the very bottom are also going to get time, but it's going to be supplemented between the aides – we're having them, teaching assistants, now – the teaching assistants are going to be working on the early success program with them.... I guess, probably the way we individualize more than anything is probably with the work of aides and maybe even some peer tutoring where we will have some individual students going out and reading with certain kids who need more attention or less attention".*

Team Two also uses educational assistants and the reading resource teacher to help with groups of students at varying reading levels. Two educational assistants help for about 50 minutes in the classroom and another aide comes for about 30 minutes a day. A special education teacher pulls out the only LD student for one hour daily. Additionally, the teachers on this team also individualize homework assignments and classroom activity packets so that students are *"able to have extra work at their level whether it's challenging or whether it's reviewing, whatever they happen to need individually."* In another classroom, students receive individual attention from a volunteer who helps in the classroom approximately four days a week. An educational assistant takes a small group of students for about 45 minutes on a daily basis. Teachers state that better knowledge of their students earlier in the year allows them to begin individualization, especially small group individualization with educational assistants, at the beginning of the school year. With gaining experience in SAGE classrooms, one team notes, modifications occur over the years, and small groups may be expanded to include mathematics and not just reading.

Predominantly, individualization is perceived as assisting students in small groups based on their academic needs and grade level objectives rather than students' interests. Team One makes the following comments about individualization in their classroom:

> *"We try to bring in their individual interests and things through the stories, maybe that we read and tap them that way, but we don't necessarily say, you know what, what animal would you like to study about, things like that. Uhm, so I think it's individual in a group sort of sense. You know that – we can kind of tailor to the four or five that need maybe certain kids additional reading help. So we can, uhm, based on their levels individualize in smaller group maybe about four or five that will help them.*
>
> *I think at our grade level, individualization also means just more practice. The kids get more practice. You know, they, when we break up into small groups, you know, there are, if there is five kids, they get more opportunities to answer questions, they get more opportunities to practice the words, they get more opportunities to, you know, to do a lot of things that in the large group, you know, it would be cut back so much or they wouldn't get any practice in some cases."*

Team Two also states that they individualize their teaching and lessons according to the child's strengths

and weaknesses. While the teachers regard individual students' interests of importance, they give priority to reaching grade level objectives first and then would allow for more freedom in student choices.

For Meadow View, individualization needs to be considered in conjunction with team teaching and working out a routine in the classroom that involves two teachers. Classroom observations provide snapshots of how teachers have developed a routine of "*lead and support*." It appears that one teacher generally leads the lesson or activity while the other teacher supports what is taking place in the classroom by monitoring students' progress, helping individual students or small groups, testing students, and reinforcing appropriate behavior. Field notes contain examples of these practices.

During one school visit, the following observations were noted in field notes. While one teacher leads the reading activity with the whole class, the other teacher is calling on individual students. The students come to the teacher's desk, and she reviews projects with individual students. The topic of the project is "Inventions that Take Us into the Millenium." Earlier in the week, the students had created the actual invention/machine with math manipulatives and other materials in class. The teachers took photographs of each student and his/her invention. The teacher shows these pictures to the students as they come up to her desk. The students have also written a story about their invention. An Educational Assistant is helping with this activity; it appears that she sorted out papers that need corrections or are not finished. The teacher reviews the writing with each student. Then the student and the teacher make some corrections together. Examples of corrections are run-on sentences and capitalization errors. The teacher asks questions, points out errors, asks the student for explanations, and then explains corrections to student. Some corrections pertain to the format and content of the writing. For example, the writing needs to have a title, the inventor's name, and a description of what the invention is or how it works. When all of the corrections have been made, the teacher staples the photograph to the writing. The work will be displayed in the hall, where other invention projects are already on display.

The following observation was made on another day. It is approximately 10:00 A.M. outside the first grade classroom. Five students and one of the first grade teachers are seated at a table out in the hall by the classroom door. These five students and the teacher are working on reading skills. In the meantime in the classroom, the remaining twenty students and the second teacher are gearing up to review the answers to the morning work. On another occasion the following scene of teaming and individualization was observed during a visit to the school. One teacher is seated at a table out in the hall working on reading with one student. The teacher explained later that the school district requires a reading assessment of each student in the class. While the teacher in the hall works on reading assessment with one student, the other teacher instruct the whole class. Students are working on what is called the morning activity. The work is on the board and students copy it on loose-leaf paper and put the answers/corrections on their paper.

Discipline

Teachers state that having two teachers in the room has impacted discipline in two significant ways. First, discipline issues can be handled in a more constructive and positive way. As the teachers observe, you have more options besides sending the student out of the classroom. One of the team members can deal with the situation immediately, and a lot of frustration for students and teacher can be avoided. Secondly, not only can teachers attend to discipline issues immediately, they also do not lose their "momentum" in the lesson. Being able to continue with instruction, teachers note, is a positive effect of having two teachers in the classroom. One teacher makes the following comment about discipline:

> *"...if there is a discipline problem, being able to deal with it immediately, keeps all the rest of the kids on task, and it prevents them from going off task also. To me what I've seen and experienced in this, I mean, we spend so much more time teaching, one just picks up for other*

one if they are dealing with something. And there's not - like a beat isn't missed. And if you were alone, you know, that would not be happening."

Teachers agree that fewer discipline problems or being able to have one teacher deal with the problem, has a positive effect on instructional time. What teachers describe as "*not missing a beat*" or being "*able to continue with instruction*" translates to better and increased learning opportunities for students in SAGE classrooms.

Content Coverage

Teachers feel that they are more likely to cover the curriculum required by grade level and at times are able to go beyond the required curriculum. The following teacher comments illustrate the teachers' perceptions about content coverage:

"...We always had a pretty strong curriculum. I just think that we are doing a better job at, ahh, with the curriculum. We can actually do more than we were doing before. Students are working more rigorously now, and where we weren't able to meet some goals, we are getting closer to that now."

"I think we are accomplishing more, covering more things."

"We've covered more things and deeper ..."

"...you really dig deep into a subject."

Teachers seem to also see a connection between more and deeper content coverage and opportunities for more hands-on activities.

Hands-on Activities

Finding the time for hands-on activities and making the activity a worthwhile learning experience are of importance to the teachers. One teacher at the school states:

"...a lot of times when I had things to pass out, it was almost time to collect them. So by having two adults there, we're able to do more of the hands-on. Plus we are able to actually observe what they are doing with the hands-on, if they are using the correct manner not just to be playing. So they actually learn from them."

Team taught SAGE classrooms seem to make hands-on activities possible at Meadow View. A trip to the pumpkin farm, for example, was developed into subsequent math and science activities such as cutting pumpkins open, picking seeds out of the pulp, and counting the seeds. The teachers said that if they had been by themselves, meaning one teacher with 30 students, it would have been a giant mess and impossible to keep students focused on what they were supposed to do. The following two teacher comments illustrate teacher perceptions about hands-on activities in team taught classrooms:

"I am really finding that you can get to a lot more material and more quickly than before. And we are able to expand more We're able to do hands-on; it's a great way to learn. With 30:1 it's really difficult to get all the pieces set up and ... without losing your mind. We're able to do a lot more hands-on things and ...ah, to teach a lot more than we had been in the same amount of time.

I think it leads to more hands-on things because even in science you can give kids opportunities to do things and then there are two people who are both monitoring and helping them with problems and things like that. And so it keeps them more on task and if they are more on task, they're learning more. And with the two of us, I know, I'm more willing to try certain things because there is always a second person to be able to help out."

Teachers frequently mention math manipulatives such as cubes, shapes, and counters when talking about hands-on activities. Team One estimates that they use hands-on activities 2-3 times a week. Team Two states more than once a week. And teachers generally feel that they are more likely to engage in hands-on activities now that two teachers are in the room.

SAGE Difference

Teachers were asked to reflect on the extent children who were in a SAGE classroom last year are different from children who were not in a SAGE classroom previously. Two teachers perceive no significant differences, academically or socially. But both note that in general the kids seem to be more dependent on the teacher for attention or direction than they were used to. One of these teachers, a first year SAGE teacher, coins this observation *"learned dependency on the teacher"* and speculates that having two teachers, as in team taught SAGE classrooms, may have contributed to this dependency. Another teacher observes that groups of children differ from year to year, and in some years he noticed a greater academic readiness than in other years. One teacher observes that the school's high mobility rate often makes it difficult to determine a student's prior SAGE experience. SAGE classrooms are naturally occurring classrooms, and students from other SAGE and non-SAGE schools move in and out of Meadow View's classrooms throughout the year. Another teacher who has been a SAGE teacher at the school since the inception of SAGE makes the following observations:

"I don't know what they were like before they came to me. But I know, I think the ones who were in SAGE last year because they were all together last year have some kind of a family unity bond. So that was kind of special. And then those who came in new ... [inaudible]... became part of the class. But I really don't know what they were like before they came so I really wouldn't be able to see the difference. Academically, I think, uhm, our kids that were in SAGE were a little bit stronger, you know, on average. Some would be low, but uhm, that's about all I can really say."

This view, however, is not shared by her colleague who states that he could predict who had been in a SAGE classroom. To this teacher, the child who had been in a SAGE classroom seemed to have more confidence about the second grade environment which students new to the SAGE experience of a reduced-size classroom seemed to be lacking.

Accuracy of Model

In general, teachers did not recommend adding or subtracting elements from the Model of Teaching, which is based on the results of the first and second year of SAGE. One team perceived individualization to be the main effect of smaller class sizes, another team stated that student achievement was the main effect, and the third team thought that students' needs were met better. Two teams felt that the model is lacking a parent component. One teacher makes this statement:

"Just one thing to consider about it is how - and this is a hard thing to determine, but how involved are parents. You know. Where do parents fit into the model? Because I think a lot of

the kids, you see the big improvements where the parents are really working with them at home and that tends to be, I think, it's a strong support for what the kids are doing. And we can tell them something for 6 hours a day but if they're getting something else for the other ..."

Only one team engaged in speculation about redrawing a few arrows or adding a few arrows. Noteworthy is a suggestion of more time for preparation in team taught classrooms. And two teachers note a relationship between "*more teacher enthusiasm*" and team work. However, the model does not account for issues relating to team taught situations. One team states that they work well together but were teamed by chance without knowing each other prior to coming to the third grade team situation at Meadow View. Both taught at other schools prior to this year. They feel that good working relationships of teams are not the case for all teams at the school, and team member combinations change from year to year. The teachers state that teachers at the school have the option to team teach the class or to split up the group of students. These two teachers plan to team teach again next year.

Parent Perspective

A parent who is also an educational assistant at Meadow View provides insight into her and her children's experience with the SAGE program. The parent shares the following observations:

"I've worked here for about 8 years. And I see the difference with the SAGE program, with the two teachers in the classroom than the one teacher in the classroom. You know if a kid is having a problem, he has two teachers in the classroom. You have one teacher that could take that kid out while the other teacher teaches. You know the other kids, you know what I mean, I love the program. I really do. And I mean, I'm going back to school and I'm gonna be teaching. And I hope that when I do finish my degree that I end up being in the SAGE program because I love the team teaching thing. It's wonderful. It can't get no better than that. Two teachers in the classroom and then you have an assistant that comes in and helps. But like I said it can't get no better than that.

What I have noticed is my daughter, she is coming home, uhm, she's talking about how much she's learned in school. She's talking about the different things that she learns. Ah, she's coming home saying big words. [Laughter] "Prediction" and "Discover" and you know and she, um, she came home one day, and she was telling me about the different groups that she goes in. I noticed that the teachers have two separate groups. And by the assistant being in the classroom, then they have three. So the kids get to learn more. You know, like the group ... that are ... like one teacher would have 15 kids and the other teacher would have the other 15. But you know the kids are really learning because the teacher don't have one teacher is not trying to teach 30 kids and is distracted when one kid acts up, and he can't pay attention to the other rest of the other 29. So I really like it. I love the program. And I wish they would keep it because my daughter has learned a lot with the SAGE program. And she's gonna be going to the second grade. And they have SAGE in second grade so I know she'll learn a lot more. You know because with the one teacher in the classroom, I know it's hard. It's very hard. And the SAGE program works a whole lot for my daughter."

Oakdale School: Regular Reduced Size Classes (15:1)

School

Oakdale Elementary School is located in an economically middle class integrated neighborhood. However, four buses are bringing mostly African American children from a predominately low-income neighborhood

to make up approximately 200 of the 330 students attending the school. About 64% of the student population qualifies for free or reduced lunch.

The building itself consists of two stories arranged in a semi-circular fashion. As one wanders through the building, it is not the classrooms or support areas that are most noticeable; it is instead the pervasive feeling of peace, pride, and priority. There are signs of the efforts to create peace over every classroom door, on bulletin boards, and in the busy sounds of learning that waft down the halls.

Particularly impressive to me were the rules listed in the library and media center (LMC) that were clearly created with student input and followed through on the theme of PEACE which is pervasive throughout the school. While I was there, I heard no raised voices or disgruntled sounds. It really was peaceful!

According to Jane Peters, the principal of Oakdale, the staff consist of over 50 professionals, numerous additional teacher aides and volunteers who come into the classroom from two to three times each week. The volunteer program is very well developed. In large part it consists of grandparent volunteers who are retired University of Wisconsin professors. Support comes in the form of different reading support teachers; music, art, physical education teachers; computer teachers and signers for students who are hearing impaired; teachers with experience in working with students who have a variety of learning or emotional disabilities; and a very active LMC program director. Two unusual support features at Oakdale are the *Book Room* and the *PAR Room*. The Book Room is a room that contains copies of all books used in the school. In this room there are listening centers, Big Book centers, Anthologies, Plays, Book Boxes, Leveled Books, professional resources for teachers, TV/VCRs with closed captioning, and a Publishing Center for students and staff use. The PAR Room (Positive Attitude Room) is located off by itself and is staffed by a full-time teacher. There are small study spaces for completion of work, individual help, or simple separation areas for problem children. Although the teachers acknowledge that some students do not like to come to the PAR Room, most students do not look at it as something embarrassing. Rather, they look at it as something they need for a short time. This room did not feel like a time out room or a negative place, but clearly there were rules, and it is considered a work space, not just a punishment place. The atmosphere was in keeping with the whole school's emphasis on becoming peacemakers.

The type of SAGE classroom practiced at Oakdale is fifteen students with one teacher in a separate classroom. Working hand-in-hand with SAGE, at Oakdale, is an active Title I program which has led the staff to using "best practices," especially for reading. They are in the process of planning and working on the same kind of program for mathematics. There are approximately three classes of every grade. Kindergarten, second, and third grade classes were all 15 or under. A source of dissension is the fact that all three of the first grade classrooms had 18 or 19 students and the teachers felt this was not good. One first grade teacher described the situation in this way:

> *"I did have 18 (students) and we were not pleased with that. They did take care of the problem of being over 15-1 in 2nd and 3rd grade but (voice raised) Jane Peters did not listen to us because we were asking for another classroom or something that we could do to alleviate...because you know if you took three out of each classroom, out of four classrooms, you'd almost have a full classroom...another full class. She didn't do anything. She said, "Well, you've had it good in the past". We weren't real pleased with that and I did call DPI (Department of Public Instruction) on it. I sometimes wonder if the test is valid because we are over! We did ask our reading support person to go to the principal (Jane Peters) and talk about getting assistance. So, in the past week she has come up with some assistant time which should alleviate getting to some of the kids."*

During the course of the school year, this problem was solved by hiring two full time teacher aides for first

grade.

It appeared that the case of the teacher with 18 students might not be worrying about student learning as much as the power struggle between the first grade teachers and the principal. However, later in the school year, the first grade teachers seemed to be content with the situation as it was. Surprising to the teachers, their class numbers stayed at 18 or 19 all year with less student movement than they had experienced in the past.

SAGE is not limited to class size at Oakdale. Lighted Schoolhouse is part of the SAGE plan. Conferences are done in three different ways to encourage attendance. They do some outreach for parent education both in the area of parenting and some technology training. Ms. Peters, the principal, refers to Oakdale as a family school that focuses on the area of family literacy as the road for providing a variety of ways for people to be connected to the school. They have child care available, clubs, Retired Seniors Volunteers (RSVP), and a variety of educational opportunities for teachers and parents. Not only are educational opportunities available, but leadership roles in sharing knowledge with other professionals are part of the expectations for the teaching staff of Oakdale. They have a tradition of studying, learning, planning, and then sharing with others in their field.

A Picture of Teachers and other Professionals at Oakdale

Oakdale has been a SAGE school for three years. The principal, Jane Peters, has a BSE in elementary education and a Ph.D. in education.

When asked about her philosophy, Jane Peters talked about student learning and teaching to children's strengths. She mentioned that all people are life-long learners and that the real philosophical dilemma is to find the best way to model collaboration, trust, and good learning as teachers work toward understanding that wherever a student is academically is OK; it is just not OK to be there forever. Jane sees her role very clearly:

> *"I think the other part of my job is really finding the right questions to ask. And I used to think my job was working with teams and doing the stuff of the school. I came from a coordinator's background and that's what you do, but I have learned, at least for this building, is finding the right questions to ask, paying close attention in meetings and such so that when teachers talk in meetings and so on to understand what that talk means. You know, what is it, what kinds of things do I need now that I have made the assessment? What is it that I need to help them or to provide for them to get to this next level, or move on? So, it's a lot about the questions you ask and I came to that realization later rather than earlier (laughs at herself) But I do think it's how you ask them, and what you ask and then seeing what comes of it. You can only work from their strengths just like the kids, what they can almost do. So, there is a whole laundry list of things we don't do that probably need to be done, but we have only so much energy and we look at what is the biggest payoff to us in terms of student learning. I guess that is another part of my job, this constancy of purpose. Providing the lead to say when we do this we are really doing these other things. Being able to say OK that really is a need but before we can get there, we need to work here. We use the lessons we learn from our strengths to help us to accelerate our progress through our not as strong areas, but we must work from what we can do before tackling what we can almost do."*

Jean John has been a teacher at Oakdale for 14 years and has a BSE in elementary education.

Jean described her philosophy of education in terms of priorities. She is very experienced in teaching first

grade but still makes student learning a top priority. She likes to give hands-on experiences that students can relate to. She sees this as an opportunity to see things from a child's perspective. She likes to incorporate proven strategies such as the Reading Recovery model into her own teaching. A major goal is to get the children to be independent learners and use strategies that will enable them to work independently and do their problem solving on their own. Ms. John commented that flexibility is a necessity for working successfully with other professionals at Oakdale, but that most people place the good of the child first. She admonishes everyone to place children as a top priority "cause that's why we're here!".

Cooperative groups, out of seat activities, center work, manipulatives, interactive writing, whole group, and small group activities are methods Jean uses to teach the strategies children need to move from what they know to what they can do next.

I noticed that Jean often referred to what she had learned as a result of the Title I and literacy training that the whole school participated in. It seemed that she was very confident and comfortable speaking to me. She made a point of letting me know that knowledge and training brings change to the way she approaches her class. That was part of what she meant when she talked about flexibility.

Carla Berg has a BSE and has been at Oakdale for eight years.

Ms. Berg has eighteen years of teaching experience. Her philosophy toward her students is one of a personal type classroom. She places great emphasis on knowing her students as individuals and maintains a quiet, but deeply interested persona in the classroom. Her own words describe her philosophy best:

> *"I get to know the students in a more personal way. It is almost like I think of them as my family and so I like knowing them better an' particularly goin' out every day to help them as individuals or in small groups. I am able to get up from my reading table and rove through the room to make sure that the children are doing the right thing, keep them on task. So, I don't have any behavior problems. With smaller groups I can meet their individual needs and receive an immediate response from the children. I know each child's particular style of learning. We are able to do a lot of role playing when children have conflicts; stop right then and work things out. Now they don't have to sit in their seats so much and it's much more fun. I find it is professionally rewarding too."*

Ms. Berg is a soft-spoken African American woman. Although she was very nervous about being interviewed, when she was in front of her class, there were no signs of any nervousness. She seems to be very student centered in her teaching with an instinct for student success in what the principal described as a challenging class. Her gentle manner holds true in her dealings with all of her students.

Jackie Park has a BS in Finance and accumulated 20 years in banking/finance before returning to school to earn a BSE.

Jackie came from a 20 year business background where she freely admitted the money was better, but the work became mindless. She returned to school to get a degree in education because she felt called to this profession. She brings a group of unusual experiences to her classroom and a powerful dedication to her students and her professional life.

Jackie is a very articulate woman with whom it is easy to develop an immediate rapport. Professional discussions flowed and frequently were long. She made a point of putting the students first in every conversation we had. From observation, it appears that she follows through with her beliefs. As she functions throughout the day, she seamlessly takes over the role of school leader and willing mentor for

others. She was an outstanding spokes woman for SAGE. Her words about what she believes are clear:

> *"The goal I have as a teacher is to help the child become responsible for their learning, not to tell but to facilitate, to take a child from whatever point they are at when they come to this school and lead them to the next point, whatever that is ...as far as we can get them. I set high expectations. We work through frustrations and in our school we see a lot of frustration from the kids. We see a lot of turnover. So, my goal is for them to become responsible and to love it. To just love learning and be curious about everything around them. That's my goal.*
>
> *I make certain that I interact with every kid each day. The kids in my class are actively learning all day long. I do a lot of one-on-one and hands-on learning. We have the "best practices" that we have been working on as a school and we have also adopted a literacy program or literacy philosophy. We have gone from not clearly understanding where each child is at to understanding where each child is and taking them to the next step. Assessment drives the learning and makes clear the teaching point. So, I use the specific Teaching, Learning Cycle, with different tools, all to help the student find the answers they need to move on with their education.*
>
> *The role of the teacher takes a lot of energy because students move through material faster [than before SAGE]. But it is also very exciting to see students moving forward with such deep learning. The teacher has to model enthusiasm and love of learning so that the children can also learn to become life-long learners. SAGE experience has changed my teaching life. It took me a while to adjust. I had my first six years here, learning to work what I call crowd control, learning to be effective in the classroom, at least as effective as I could be with a larger class. With SAGE I had to adjust from the group mode to the individual mode. The questions about how to keep children busy and active as I was working with other parts of the group gave me practice in centers and "busy" work. Now almost everything we do is as a small group and I go between those small groups and interact with every group, every day, whether it is reading, science, math or personal conference. I know my kids and I can concentrate on guiding the child to the next step".*

Teaching

Individualization.

Every SAGE teacher interviewed felt that individualization was a strong point of growth. Particularly effective was the response of one African American parent speaking to me at a small PTO meeting. When asked if she could describe any changes from the SAGE classroom when it comes to your child' learning activities or attitude toward school anything that is maybe a result of having a smaller class size, she responded.

> *"I have a daughter in the special needs and having a smaller class, she gets more of the teacher's attention so she performs better...not only performs better, but she finishes her things. The teacher is able to check and see, oh, she did finish the project. In fact, where we were there were 23 kids in the class and this wasn't always the case. I had to ask the teacher to send home one copy of all of her work so I know what Cindy didn't finish and that is not the case here (Oakdale). She is so happy to have finished it (assignments) in class that her self-esteem has improved as she finishes and she is able to get the sticker or the stamp the same as the other kids.The smaller class also makes it possible for the teachers to get to know the kids a lot faster, so they can assess their strengths and weaknesses right away and start working from those*

points right away."

Teachers at Oakdale commend SAGE for making more individualization possible. However, the idea of individualization comes in many forms. One common thread among all descriptions of individualization is that the students' reading program is planned from the place the student begins and changes according to the students' needs. Because of the high level of volunteerism and the classroom use of support personnel, students rarely work in groups larger than three, and those groups often change according to the specific learning needs at any given time. Although one first grade classroom teacher spoke of working with groups of four or five, groups larger than three were never observed once she had the use of a teaching assistant and volunteers. When teachers speak of whole group, they are often referring to preparation for either individual work or very small groups. All teachers cite the movement away from text as the guiding force and worksheets as the individualization. There are many learning centers located in all classrooms and they seem to be utilized on a daily basis. Because writing is basically an individual process, it is important to note that teachers feel that students do more writing for strategic purposes. The assessments of students' reading are generally done on an individual basis, using running records and anecdotal notes. Most teachers considered this an important part of the individualization process because of the constant need to evaluate where each student is to go with the next phase of their reading program. Jackie Park talked about individualization in the following manner:

> *"More individualization, definitely, that seems to be the whole key. As I said before, for me, it took a while to learn how to do that, and do less whole group and now I hardly ever do any whole group instruction. What I've learned to do now, when I do math and science [in integrated for], I give them a problem to work on, then I take some of the kids to observe and dialog a little bit, then I send them back to work on the problem and dialog with the other group a little. Yes, you can get in much more content, and the discussions incorporate more of what the kids have to say. Plus, they all participate because it is more intimate. The children often are guided to using higher level thinking skills during the discussions, I think because we have more time....no, we don't really have more time, our time is better spent."*

It seems to me that many times, when an Oakdale teacher speaks about individualization, they are stating that the students' learning plan is centered around where they are academically (in reading, for instance). This does not necessarily mean that the student is taught one-on-one for much of the time. In fact, very little one-on-one was observed at Oakdale. Most of all, I saw small groups or even whole groups of fifteen, with constant individual contact from the teacher were prevalent. Many classes used the support staff and grandparent volunteers to make their groups smaller. The classroom teacher roamed around between groups speaking to individual students or in some cases, the students came up to the teacher. When it was working, it was like a well-orchestrated musical with everyone in the room playing his or her part to make the chords all fit together. One math class was particularly effective in individualizing a program for each student by using a whole group approach. I had followed Ms. Berg's class to Math while she met with a parent. The following is an account of Ms. Berg's math class where an individualized program was presented through whole group instruction.

Outside the classroom a student and adult were working on reading at a desk in the hall. The teacher was seated at her desk, with a short line of students waiting to speak to her while classical music quietly played. Out of the seven students in the room, those who were not in line worked in the "areas" of the classroom. Some worked on math at the back table using manipulatives, some finished their math and went to either their own desk or carpet to read, and some worked at checking out work individually with the teacher. This was clearly a normal routine. Some students hummed with the music, others talked quietly, but none was uninvolved in what was obviously a work time.

Each child had a personal math book for January and February, made by the teacher. The teacher was running what looked to be a mini-economy book store where students had to trade in certain math points for pretend money to purchase items from their classroom store. Students did conversions of points into money with the teacher's help.

The following conversation occurred:

Student: What does three quarters equal?

Teacher: What is 20 plus 20?

Student: 30, 40.

Teacher: What is 5 plus 5?

Student: 10.

Teacher: What is 40 plus 10?

Student: 50.

Teachers: How may quarters is that?

Student: 2.

Teacher: What is 50 plus 20?

Student: 60, 70.

Teacher: What is 70 plus 5?

Student: 75.

Teacher: Then what does 3 quarters equal?

Student: 75 (Happily smiles).

Teacher: What are you going to do with that information?

Student: Use it!

In this impressive, individualized lesson, the student who had the question gained a way to solve problems, but the quiet patience with which other students waited was also impressive. Perhaps they knew their time for questions or answers would come also. This illustrated a real advantage of a smaller class.

Knowledge of Students/Discipline

Most of the teachers interviewed felt that knowledge of the student and immediate attention leads to an easier time with discipline. Ms. Berg described the connection very clearly:

"SAGE has been wonderful because I can get to the students and it's more of a personal type of classroom. It's almost like I think of them as (pause) my family and so I like knowing them better, and particularly going out every day to help them as individuals or in small groups. I think this helps children to feel better about themselves individually, and I think it helps with the discipline.

The type of things I try to do are to praise the children by going around and giving them the personal touch or a tap on the shoulder or stickers. I think it has created a closer relationship. When a child has a particular interest or problem, we can give them more of a personal touch. It keeps the children on task and then I don't have behavior problems. The groups are much smaller that I can teach and I can more meet their individual needs. I also receive an immediate response from the children

I have an individual in my room who had a bad situation at home and from knowing him so well, I knew that I had to give him special attention that day and not stress him out by giving him extra work, and giving a lot of extra hugs to get him through the day. The payoff for this boy is I think he may be more successful in life, especially coming from a home where he has to do whatever he is doing on his own. So SAGE gives him a lot of support and some experience with how to function successfully as a member of a classroom society. I hope that transfers to society at large."

As SAGE teachers at Oakdale found that they spend less time on discipline, they also discovered that there seems to be more instructional time and according to most, the time is spent interacting student to teacher and student to student, which creates more excited enthusiasm from students and teachers. They all suggested that they felt they were able to delve deeper into subject matter and still offer individual growth because they are not spending time disciplining students.

Content

Teachers seemed to feel that they were able to go deeper into subject areas often by using integrated activities, such as science and math together, and more hands-on activities. They all mentioned the use of manipulatives. However, there was almost an air of apology when they discussed their math program because they said it was being developed. Having smaller classes enabled the scheduling of blocks of time for reading and for math. Most teachers felt that longer blocks of time would lead to greater content coverage in math, but this was the first year.

Perceived Effects

To a person, all agreed that the main effects of SAGE were in greater student success in school. More individualization seems to be the key as far as the professional staff, parents, and volunteers are concerned. Students, generally are seen as having more enthusiasm for their own learning because they are so completely involved in a personal kind of learning. Assessments that guide the teachers seem to be better directed at individual student's learning. The model of classroom events from the first two years of SAGE explained what staff thought was going on. Jane Peters was particularly articulate in explaining the vision of this model:

"I think the major success this year and every other year of SAGE has been the increased achievement. The children are achieving so much more than they have in the past with the old class size. As we have developed our assessment strategies and become much more involved in looking at assessment as part of the learning cycle, it's become much more apparent to us how

much learning goes on when we reduce the class sizes. For example, we are right now, at or above the district average in our writing assessment. When you consider the neediness of the building, that's a pretty dramatic kind of thing and I think some of that is a result of SAGE.

However, although there is a lot of truth in the model, my experience would say that a lot of this is certainly right on to what we have seen, but we have to be careful when we talk about class size being totally responsible or even in a major way responsible because I think it's the small class size combined with something else, the staff development that goes along with what you want people to do with those smaller class sizes. People have to teach in different ways for the class size to give you the payoff that you really want it to have.

Certainly there will be less discipline just because there are fewer bodies in the class but to make this really count is changing. How do you help children to learn about being more self-disciplined? How do you set up structures within the classroom to build a sense of community? Those kinds of goals come through teaching teachers and having an expectation in the building (for use of the teachings learned in staff development). You know you have an idea of how you want the climate to be and I think class size is a big part of that but it isn't either what you start with or what you end with, it's part of the mix, if you will.

I certainly see more teacher enthusiasm. I think that some of this enthusiasm comes from better assessment and being able to document and watch developing growth. Not to have to infer growth or surmise, but to be able to see it contribute to more teacher enthusiasm because teachers see how much they are able to do. And class size makes it easier to do those best practices...I think the small class size does just that."

The theme of staff development, working hand-in-hand with SAGE, appeared to be consistent. It was a little ironic that no one mentioned that staff development is a part of the SAGE plan. Even Jane Peters seemed to think of the many different areas of staff development that have taken place at Oakdale as an add-on to SAGE rather than an integral part of learning how to make maximum gains from a small class.

Even though there are other aspects of SAGE, most of the people at Oakdale centered their discussions around the differences that a small class could make in a student's learning. Given a lead to talk about community or the importance of continual development of teachers still seemed rarely to lead to integration of SAGE with other sectors of school life. Clearly SAGE is visualized as only limiting class size and other developmental programs are completely separate from SAGE.

The SAGE program seems innately to strike a positive chord with everyone connected to Oakdale. In many different words, people told that reducing class size is a "no brainer". It also makes sense that the strong staff development component will make the whole experience of smaller classes a successful one for students.

Case Study Summary

The three case studies confirm and clarify SAGE findings about classroom events from 1996-97 and 1997-98. The conclusion that the main effect on teaching of reduced class size is increased use of individualization is strengthened. All of the teachers involved voiced this opinion and extensive individualization was witnessed during every visit to the three schools.

The individualization that occurs is procedural rather than substantive. It is, as one teacher remarked, "*tailored instruction*." Students are neither permitted to pursue their own interests nor are they provided with a personalized curriculum that varies from the established curriculum. All students learn the same content and skills, but they may learn them at a different pace and in a different way. As the Cleveland teachers reported, instruction is based on the individual's current level of proficiency. It builds on what each student presently knows or knows how to do.

One-to-one tutoring takes place in reduced size classes both for short periods as the teacher monitors an activity and for longer periods when a problem is encountered. But, the dominant mode of individualization is fluid, homogeneous, small groups led by the teacher. The reading and mathematics lessons are usually taught according to a common format including a total class overview, orientation, or directions and then arrangement of the class into groups monitored or taught by the teacher as well as teacher aides or volunteers. With groups of 3 or 4, each student can actively participate. He or she can raise questions, make comments, show work, receive feedback, and rethink and revise.

What appears to happen to teachers when they teach reduced size classes is that they develop a different mind set. Instead of viewing their pedagogical world as one class of 25 students, they view it more as 15 classes of one student. Given the speed with which teachers adapt to teaching reduced size classes, it appears that this state of mind has been present all along but made dormant by the stress of large classes. Once this state of mind is activated, it pervades all facets of reduced class size teaching. Even when the class of 15 students is taught as a whole, each student is heard and each receives a "tailored" response.

How individualization as practiced in reduced size classes leads to increased learning over students in larger classes might be explained with reference to constructivistic theory. Constuctivism suggests that humans construct or create their own understandings based on their prior knowledge. When they experience new ideas, they either fit them into their present knowledge structures, revise their existing knowledge structures to accommodate them, or develop new knowledge structures. For this process to take place, articulation and critique are essential. For knowledge to grow, we must give voice to our present understandings. We must say what we believe or show what we know how to do. Others can then offer feedback, advice, or challenge, which causes us to rethink our understandings. It also causes the person giving the critique to rethink the conceptions that he or she holds. The opportunity for articulation and critique to occur increases dramatically as classes become smaller. More students can share their understandings more often and teachers and others can offer more personalized feedback more frequently. As students display their knowledge, teachers can target their assistance. The result should be more and deeper understanding or learning.

1998-99 case study data also support the conclusion drawn from previous SAGE data that individualization is related to increased knowledge of students, to reduced discipline, and subsequently, more instructional time, and to greater enthusiasm. Teachers reported that they know their students both academically and socially much better which results in a more personal, relaxed, family-like classroom atmosphere. They also said, and observations substantiated, that classroom time was totally devoted to teaching because disciplinary behavior was generally not needed. It is interesting to note that discipline problems disappear in reduced size classes not only because inappropriate behavior is instantly recognized in a small class and can be given a response with no delay and because teacher-student proximity reduces its occurrence, but because in a reduced size class inappropriate behavior is redefined. As several teachers revealed, in a small class students are given more freedom. Many behaviors not tolerated in a large class, because of the problems they create, such as walking around the room, are acceptable in a small class. Further, there is also less misbehavior because students' greater understanding in small classes causes them to be less confused and, subsequently, better behaved. In relation to teacher enthusiasm, the case study teachers provided similar responses as SAGE teachers from prior years. They indicated that reduced class

size and the student progress that they see energized them and caused a great deal of satisfaction and excitement regarding teaching.

The dominant mode of interacting with students that emerged from the case studies is direct instruction but growing use of hands-on activities was also noted. Increased use of hands-on activities such as manipulatives in mathematics, drama in reading, and other non-text book, non-worksheet activities occurs in reduced size classes because normal impediments to their use are not present in reduced size classes. In reduced size classes fewer materials are needed, teachers have more time to prepare, misbehavior is less likely, and basic curricula have been covered.

Consistent with previous findings, the effects of reduced size classes and the individualization it fosters as reported by the case study teachers is increased learning. Teachers reported that more content, including content designated for the next grade level, and deeper content were acquired by students. Other outcomes or effects were also reported, however. These include critical thinking, independence, and social responsibility, as well as enthusiasm for school and improved attendance. The personal and social effects occur because of the family-like environment and individual attention that exists in the reduced size class. Students are freer to express themselves verbally and physically, they help each other as they observe the teacher helping them, and they see their ideas as having worth when the ideas receive attention from others. A teaching team new to SAGE at Meadow View School reported that they thought team-taught, reduced-size classes caused students to become more dependent. This could be seen as a sign of the success of individualization rather than an undesirable outcome. That is, reduced class size students learn to speak up and ask for help when they have a problem or share an achievement about which they are excited rather than to remain silent. Their actions could actually signal that they have become more independent, not more dependent.

Most case study teachers see reduced class size as benefiting all students, but they commented on its particular benefits for special education students. They suggest that the individualization that it causes may prevent future need for special education for some students, spare early labeling for others, and, for those already diagnosed, increase the time they spend in the regular classroom. Simply stated, the needs of all students can be met in the reduced size class, the teachers believe.

Some differences across classes were seen in type of SAGE, but differences between reading and mathematics and differences across the three grade levels were not observed. In terms of subject and grade level the pattern of teaching in which individualization is prominent does not appear to vary. In terms of type of SAGE classes, team taught classes share the general profile of all reduced size classes, but they achieve it in different ways to some extent. With two teachers, they are able to do many things simultaneously, such as teaching, monitoring, disciplining, preparing, and evaluating. That reduced class size brings about a change in classroom events and has an impact on student learning is not in doubt. It is, however, as the principal at Oakdale School remarked, only "*part of the mix.*" Individualization may not always be done well.

All Teachers

Self reported data from of all SAGE teachers regarding their teaching are contained in Table 49. These data obtained from the Teacher Questionnaire again show that individualization is the major teaching product of reduced class size. Table 49 shows that for the total group of SAGE teachers, the teacher behaviors that received the highest ratings and rankings in addition to individualization are engaging students in discussion, using hands-on activities, teaching rather than disciplining, covering more content, and enthusiasm for teaching. Those behaviors receiving comparatively lower ratings and rankings are the more student centered behaviors of using students' prior knowledge, using cooperative groups, giving

students choices in learning activities, and integrating content from several subjects. Problem solving activities and in depth content have ratings and rankings between the high and low groups of behaviors.

Teacher behavior by grade levels is reported in Table 51, and teacher behavior by type of SAGE classroom is reported in Table 52. It can be seen that the general pattern is also descriptive of each grade level and each type of classroom. The major teacher behaviors are individualization , student engagement, and to a slightly lesser extent, hands-on activities, teaching rather than disciplining, and covering content. A difference regarding grade level is that teachers at each succeeding grade are less uniform in their responses. First grade teachers have the strongest agreement about the effects of reduced size class on teaching and third grade teachers have the weakest.

The Teacher Questionnaire also reports data about teaching in terms of student participation. At least 75% of the teachers see their students as being more attentive, participating more in class, asking for help more often, being more enthusiastic about tasks, and displaying more self-direction.

The principal estimates of the reduced class size effect on teaching presents the same picture of teaching revealed by the case studies and the Teacher Questionnaire. Individualization, diagnosis, and treatment of learning problems, assessment of progress, immediate feedback, and an environment or human relationships conclusive to learning were frequently mentioned. One principal commented in the following way:

> *"Establishing a classroom student-teacher ratio of 15:1 or smaller, has allowed the teachers more individualized instruction. This has allowed the teachers a clearer picture of each child's needs. The curriculum is being met and students are progressing because of the friendly small group environment. The social needs of the students are being cared for which allows more and better time for instruction. Since less discipline occurs, more time can be spent on the learning environment."*

Table 49. Total Questionnaire Results, Grades K-3 (Percentages)

ITEM	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Ranking*
1. More time teaching	1	1	4	49	40	16.74%
2. Covered more content	1	0	6	46	41	6.68%
3. Integrated content	0	0	4	53	37	2.85%
4. More depth	0	0	6	53	36	5.34%
5. Individualization	0	0	0	34	59	23.33%
6. More engaging	0	0	2	40	52	12.91%
7. More Hands-on	0	0	2	44	48	9.08%
8. Student's knowledge	0	0	6	55	32	3.47%
9. Problem solving	0	0	2	54	38	5.43%
10. Cooperative groups	0	1	12	46	33	3.03%
11. More opportunities	0	0	9	57	27	3.83%
12. Teacher enthusiasm	0	0	3	35	55	7.30%

N=417

*Average ranking of top three choices from the list of 12 items

Table 50. Questionnaire Results for First Grade, Second Grade, and Third Grade (Percentages)

	FIRST GRADE (N=110)					SECOND GRADE (N=101)					THIRD GRADE (N=106)				
ITEM	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
1	0	2	4	48	44	2	0	3	50	41	0	0	4	53	36
2	0	1	5	43	48	2	0	6	47	41	0	0	9	51	32
3	0	0	1	55	42	1	0	3	55	37	0	0	10	53	29
4	0	0	8	45	45	1	0	4	58	33	0	0	10	56	26
5	0	0	2	25	72	1	0	0	34	60	0	0	0	42	50
6	0	0	4	35	60	1	0	3	41	51	0	0	1	44	47
7	0	1	3	44	51	1	0	3	48	45	0	0	4	50	39
8	0	0	4	55	39	1	0	9	49	37	0	0	7	56	30
9	0	0	5	55	39	1	0	1	55	39	0	0	2	55	36
10	0	2	14	42	40	1	2	14	44	36	0	3	15	41	33
11	0	1	5	58	35	1	0	12	60	21	0	1	13	56	22
12	0	0	2	29	66	1	0	6	33	56	0	2	2	43	44

Key

SD = Strongly Disagree

D = Disagree

N = Neutral

A = Agree

SA = Strongly Agree

Table 51. Questionnaire Results for Different Types of SAGE Classrooms (Percentages)

	15:1 Reg Ratings (N=86)					15:1 SS Ratings (N=9)					30:2 TT Ratings (N=41)					30:2 FT Ratings (N=5)				
Item #	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA	SD	D	N	A	SA
1	1	0	7	48	44	0	0	11	22	67	0	0	5	39	56	0	20	20	40	20
2	0	1	7	38	54	0	0	11	22	67	0	0	0	49	51	0	0	0	60	40
3	0	0	9	48	43	0	0	11	44	44	0	0	15	61	24	0	0	40	60	0
4	0	1	9	45	44	0	0	11	33	56	0	0	7	46	46	0	0	0	100	0
5	0	0	1	24	74	0	0	0	33	67	0	0	5	34	61	0	0	0	60	40
6	0	0	0	41	59	0	0	0	44	56	0	0	2	46	51	0	0	0	80	20
7	0	0	5	40	56	0	0	22	11	67	0	2	2	39	56	0	0	20	60	20
8	0	0	20	47	34	0	0	11	44	44	0	2	2	56	39	0	0	20	60	20
9	0	0	4	52	44	0	0	11	11	78	2	2	7	51	37	0	0	20	80	0
10	0	4	12	48	37	0	0	33	33	33	0	7	27	27	39	0	0	40	40	20
11	0	2	12	51	35	0	11	22	11	56	0	5	17	51	27	0	0	20	60	20
12	0	2	4	38	55	0	12	0	20	68	0	0	0	51	49	2	0	8	22	68

Key

SD = Strongly Disagree

D = Disagree

N = Neutral

A = Agree

SA = Strongly Agree

A Model of Reduced Class Size Teaching

The kind of teaching and learning that reduced class size produces is displayed in

Figure 1. The case studies as well as the data from the Teacher Questionnaire and the Principal Questionnaire reaffirm that individualization brought about by more instructional time, more knowledge of students, and more teacher enthusiasm plus an increase in hands-on activities results in more and somewhat deeper content, and, in turn, more learning. The case studies also suggest that student critical thinking,

self-confidence, and social responsibility are outcomes of reduced class size.

Figure 1. A Model of Reduced Class Size Teaching and Learning

Rigorous Curriculum

For the purposes of the SAGE evaluation, rigorous curriculum has been defined as curriculum that is consistent with national standards in reading, language arts and mathematics as proposed by professional associations. Table 52 reports the extent to which the curriculum in the areas of reading, language arts and mathematics in SAGE schools is consistent with these standards. These data, derived from teacher perceptions on the Teacher Questionnaire, show overall agreement with the standards in both curriculum areas. In reading and language arts, the areas of greatest agreement are a) students are encouraged to choose books of personal interest, b) the names of parts of books are taught, c) students are taught to apply a variety of decoding strategies, and d) students are introduced to literary forms. The areas of least agreement are a) students are taught to critique non-print media, b) students are taught how language can

be adjusted for different audiences, and c) students are introduced to texts representing a range of historical periods.

In mathematics, the areas of greatest agreement are a) students have the opportunity to connect mathematics to everyday situations, b) students learn the enumeration system through concrete experiences, c) students have the opportunity to connect mathematics with other subject areas, and d) basic fact instruction emphasizes thinking strategies. The areas of least agreement are a) use of calculators in appropriate situations, b) the concept of chance is explored through actual events, c) perimeter and related areas are developed intuitively, and d) students create their own mathematics problems.

Teacher perceptions concerning rigorous curriculum are very similar to prior years, with greater agreement in reading and language arts than in mathematics. The areas of greatest and least agreement within both curricular areas are nearly identical to 1996-97 and 1997-98.

Table 52. Rigorous Curriculum, Grades K-2 (N, Mean, and Standard Deviation)

	N	Mean*	SD
Reading/Language Arts			
Students introduced to texts: represent range of genres	410	4.16	.64
Students introduced to texts: represent range of historical	414	3.57	2.57
Students introduced to texts: deal with topics relevant to real world	413	4.11	.59
Students introduced to texts: variety of ethnic, culture contexts	413	4.07	.72
Students taught to apply variety of decoding strategies	415	4.63	.54
Students introduced to variety of interpretative strategies	410	3.87	.82
Students taught names for parts of books	414	4.70	.51
Students introduced to literature terminology	416	4.43	.78
Students taught to categorize texts: fiction or non-fiction	415	4.10	.93
Students taught to categorize texts: topic or theme	412	3.91	.79
Students taught to categorize texts: author	415	3.97	2.15
Students taught to make associations among texts	412	3.77	.73
Student taught aware of how language can be purpose adjusted	416	[illegible]	.79

Students taught aware of how language can be audience adjusted	414	3.41	.83
Students encouraged to choose books interested in reading	414	4.73	.50
Students apply lang/conventions: critique/discuss print texts	407	3.64	.98
Students apply lang/conventions: critique/discuss non-print media	406	3.20	.99
Students apply lang/conventions: writing to develop interests	410	4.14	.79
Students apply lang/conventions: speaking to develop interests	409	3.89	.82
Mathematics			
Students write own mathematics problem about real or imaginary	412	3.20	.84
Students encouraged to develop own strategy for solving problems	412	3.94	.76
Opportunity to investigate open problems have more than one sol.	413	3.61	.82
Write in math class to reflect and demonstrate understanding	412	3.22	.96
Mathematics language and symbols introduced in context of expl.	412	4.07	.67
Opportunities to make connections between mathematics and other	414	4.06	.61
Opportunities to make connections between math & everyday	412	4.25	.59
Estimation when working with quantities, measurement, comput.	414	3.77	.74
Opportunity to explore and use estimation strategies in real sit.	413	3.60	.75
Learn enumeration through concrete experiences	412	4.26	.68
Discuss, model, draw, write about their understanding	411	3.73	.80
Instruction of facts emphasize development of	409	4.13	.68

thinking strategies			
Develop own computation strategies and algorithms	404	3.43	1.06
Calculators used in appropriate situations	408	2.59	1.21
Instruction includes concrete experiences with metric units	412	3.20	1.00
Concepts of perimeter, area, volume are developed	410	3.21	.92
Opportunity to explore geometric shapes through concrete exp.	414	3.78	.75
Opportunity to work with 3-dimensional figures	413	3.49	.86
Formulate & solve problems involving collecting & analyzing data	413	3.60	.82
Make predictions, inferences, decisions from data	415	3.77	.75
Concept of chance explored by collection of data and other events	414	3.10	.86
Concrete and real experience to develop fraction concepts	410	3.63	.91
Recognize, describe, extend patterns	413	4.15	.73
Create patterns using materials and discuss patterns	413	4.00	.79

*Mean score using five point Likert Scale

The Principal Questionnaire results support the finding that the reading and language arts curriculum and the mathematics curriculum generally are consistent with national standards. About 80% of the SAGE principals see their curriculum as being mostly or completely compliant in these areas, as seen in Table 53.

Table 53. Principal's Perceptions of Rigorous Academic Curriculum (Percentages)

	Not Implemented	Somewhat Implemented	Mostly Implemented	Completely Implemented
Area				
Reading/ Language Arts	0%	20%	53%	27%
Mathematics	0%	20%	57%	30%

Professional Development

Results concerning general and personal professional development as perceived by teachers and principals are contained in Tables 54, 55 and 56. Principals' views of the professional development program in their schools are reported in Table 54. The results show that new teacher transitions, collaborative planning, professional development, and staff evaluation programs generally are being implemented in SAGE schools.

Table 54. Principal's Perceptions of Staff Professional Development Programs (Percentages)

	Somewhat Implemented	Mostly Implemented	Completely Implemented
New teacher transition program	20%	50%	30%
Collaborative planning	23%	30%	47%
Professional development plans	23%	40%	37%
Staff evaluation program	10%	35%	55%

Table 55, which reports both the context and process of professional development in SAGE schools, shows that professional development is a prominent feature of SAGE schools. In terms of context, most teachers agree that in their school it is ongoing, is adequately funded and supported, and brings about a change in classroom practices. In terms of process, most teachers agree that in their school, the teacher is seen as a learner, a collaborative climate exists regarding staff development, teachers and principals are knowledgeable, teachers use effective approaches and strategies, and student achievement and performance is the goal. Areas of professional development in which there is some disagreement by teachers are the use

of study groups to learn about change and innovations; out-of-school collaborative learning; learning about innovations prior to deciding about their use; assessing teachers based on student learning and development activities that include theory as well as practice.

Table 55. Teachers' Perceptions of Professional Development Grades K-3 (Percentages)

ITEM	STRONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE
1. Ongoing & Regular	1	4	6	46	42
2. Changes in Practice	1	6	20	56	17
3. Adequate Funding	5	13	23	42	16
4. Widespread Support	1	9	23	48	19
5. Joint Learning	9	40	26	17	7
6. Study Groups	8	27	27	29	10
7. Improvement Plan	2	6	22	54	14
8. "Teacher as Learner"	1	5	26	48	18
9. Staff Development	1	5	19	57	18

10. Precede Decisions	4	15	37	37	7
11. Program Evaluation	2	11	36	42	8
12. Staff Development Activities	3	18	32	39	8
13. Teachers Knowledgeable	1	3	9	55	33
14. Ensure Quality	0	3	5	49	43
15. Effective Approaches	0	1	12	58	29
16. Strategies	0	1	11	52	36
17. Focus on Goals & Curriculum	1	3	21	54	21
18. Performance Assessments	1	7	19	57	16
19. Staff Development	5	21	31	35	8

N=417

Teacher views of their own professional development as reported in Table 56 show that over half of the teachers have a personal, written development plan and, in almost all cases, it is developed by the teachers themselves or in consultation with a school administrator. The results also show that most teachers collaborate in planning activities, delivering lessons, evaluating students, and in school-wide instructional initiatives. Further, they attend conferences and take improvement courses. Few teachers have attended classes on teaching small classes, probably because classes with this focus may not be available

Table 56. Teachers' Perceptions of Their Personal Professional Development (N=417)

Question #20 ***Over the past year, I have...***	Percentage of responses
Engaged in a mentoring relationship with another teacher.	43.4
Participated in joint planning activities with other SAGE teachers.	93.8
Collaborated with other teachers in delivering lessons.	87.3
Collaborated with other teachers in evaluating student progress.	88.2
Participated in a study group or on-line network.	34.5
Collaborated in school-wide instructional initiatives or themes.	66.7
Collaborated with other schools or institutions.	32.9
Conducted research connected to my teaching.	32.4
Attended a professional conference or skill-building workshop.	81.8
Attended a workshop, seminar or retreat focused on diversity or human relations training.	26.9
Attended a workshop, seminar or retreat focused on teaching smaller classes.	12.5
Taken a course for graduate of CEU credit.	57.1
Question 21 ***Do you have a personal formal, written professional development plan?***	
Yes	42.9
No	54.7
Question 22 ***Which of the following statements most accurately reflects the content of your professional development plan?***	
It was determined primarily by me	32.4
It was determined in consultation with school administrators.	11.0
It was determined in consultations with district administrators.	3.1
It was determined primarily by school and /or district administrators	4.6

Family Involvement and Lighted Schoolhouse

The extent to which SAGE school parents are involved in education of their children is reported in Table 57. The results of the Teacher Questionnaire show that teacher-parent contacts occur mostly through teacher notes, teacher and parent conversations, and telephone calls. The use of weekly progress reports is increasing, however. Use of weekly progress reports in SAGE schools has more than doubled compared to reported use in 1996-97 and in 1997-98.

Table 57. Teacher Questionnaire Results for Family Involvement (Percentages)

ITEM	1996-97 (N=212)	1997-98 (N=315)	1998-99 (N=417)
Class Newsletter	71	62	62
Weekly progress report - requiring parent signature	24	28	54
Weekly progress report - not requiring parent signature	11	12	50
Notes sent home	98	93	95
Conversations with parents	95	94	95
Parental visits to school	74	76	71
Telephone calls	92	89	91
Home visits	10	14	12

School-wide opportunities for family involvement reported by principals are shown in Table 58. The 1998-99 data on lighted schoolhouse activities were collected directly from the school principals rather than through the Department of Public Instruction, as had been the case in previous years. Data were reported for all 30 SAGE schools; however, since the same person is the principal of two schools only 29 completed questionnaires provided data.

Table 58. SAGE Schools' Lighted Schoolhouse Participation (N=29)

Activity	Number of Schools Reporting the Activity	Range of Participants in Each Activity
Child Care	11	15-80
Health Care	4	25-250
Breakfast	24	All students, daily
Tutoring	25	8-400
Homework Help	13	20-300
Extended Library	13	40-500
Adult Recreation	18	10-750
Girl and Boy Scouts	24	6-300
Music Lessons	14	3-100
Summer Reading	16	20-400
Head Start	5	40-80
Family Resource Center	6	100-200
Technology Education	6	10-354
GED Preparation	2	10-20
PTA/PTO	23	8-800
Family Literacy	8	15-500
Parent Advisory	12	4-300

Principals also reported a number of additional activities well attended by SAGE families, such as meal activities which varied from Sunday brunches, chili dinners, spaghetti dinners, holiday dinners to inviting SAGE parents once a month for the routine student breakfasts; home visits for spring report card conferences; and a variety of special activities such as family fun days, reading nights, career exploration days, and theatre productions.

DISCUSSION: MAJOR FINDINGS, LIMITATIONS, AND FUTURE REPORTS

The Student Achievement Guarantee in Education (SAGE) program is a statewide effort to increase the academic achievement of children living in poverty by reducing the student-teacher ratio in kindergarten through third grade to 15:1. Schools participating in the SAGE program are also required to implement a rigorous academic curriculum, provide before- and after-school activities for students and community members, and implement professional development and accountability plans. The SAGE evaluation is being

conducted under contract with the Department of Public Instruction by the School of Education at the University of Wisconsin–Milwaukee.

During the 1996–97 school year SAGE was implemented in 30 schools located in 21 school districts. It encompassed 84 kindergarten classrooms, 96 first grade classrooms, and 5 mixed grade classrooms enrolling 1,715 kindergarten and 1,899 first grade students. In 1997-98 the SAGE evaluation added 113 second grade classrooms in the original 30 SAGE schools. In 1998-99 the SAGE evaluation was made up of 131 kindergarten, 143 first grade, 143 second grade and 139 third grade classrooms enrolling 2,303 kindergarten, 2,508 first grade, 2,493 second grade and 2,572 third grade students.

To measure academic achievement, first-grade students in SAGE schools and in a group of comparison schools were tested in October 1998 and again in May 1999 using the Comprehensive Test of Basic Skills (CTBS) Complete Battery, Terra Nova edition, Level 10 (Fall) and Level 11 (Spring). Second-grade students were administered Level 12 in May 1999, and third grade students were administered Level 13 in May 1999. Standardized tests are not administered to kindergarten students as part of the SAGE evaluation because in the judgement of the evaluation team standardized tests at the kindergarten level are not an appropriate evaluation measure.

Major Findings

The Achievement Effect of Class Size Reduction

First Grade

- As was found in 1997-98, test scores of SAGE and Comparison schools show statistically higher performance of SAGE students in language arts, math and total scores on the post-test in 1998-99 (Table 13).
- In 1997-98 and again in 1998-99, African American SAGE students scored lower on the CTBS pre-test than African American Comparison school students, but made significantly larger gains than Comparison school students from pre-test to post-test, surpassing African American Comparison school students on the post-test (Table 16).
- In both 1997-98 and 1998-99 African American students scored significantly lower than white students on the pre-test total scale score for both SAGE and Comparison schools. African American SAGE students achieved greater gains on the total scale score than white SAGE students from pre- to post-test, closing the achievement gap. At the same time, African Americans in Comparison schools achieved lesser gains, and the achievement gap with their white Comparison school classmates widened (Table 17).

Second Grade

- African American SAGE students scored significantly higher than African American Comparison school students on every sub-test and total scores in 1998-99 (Table 27).
- When looking at gains made fin 1998-99 from the first grade post-test to the second grade test, SAGE African American students made the same significant gains that the white SAGE students did, and did close the achievement gap between African American and white SAGE students although the relative gain was not significant (Table 28).

Third Grade

- SAGE students scored significantly higher in reading, language arts, math, and total score than

Comparison students on the third grade test in 1998-99 (Table 34).

- In 1998-99, test results suggest that statistically significant positive effects of SAGE occurred in first grade, were maintained in second and third grade (Table 35).
- In 1998-99, African American SAGE students performed significantly higher on every sub-test and total score over African American Comparison students on the third grade test (Table 39).
- When second grade is used for a baseline score, African American SAGE students outperform African American Comparison students in reading, math, and total in 1998-99 (Table 39).
- African American students gained significantly more then SAGE white students in third grade, closing the achievement gap. Comparison school African American students did not gain significantly from second to third grade. In Comparison schools the gap between the performance of white and African American students widened (Table 40).

Additional Analyses

- Although they are not statistically significant, there are positive relationships between years of SAGE experience and student performance. This suggests that years of participation in SAGE may have a positive influence on achievement, although further research is necessary in this area (pp. 57-8).
- In all cases, classrooms with more affluent children from outperformed classrooms with children from poorer families (pp. 58-9).
- Classrooms with 30:2 student-teacher ratios achieved just as well as classrooms with 15:1 student-teacher ratios with the exception of language arts and mathematics sub-tests in second grade (pp. 59-60).
- In 1998-99 at the class level of analysis, smaller classrooms tended to score significantly higher in language arts, mathematics and reading, as well as total score after adjusting for individual pre-test results, socio-economic status and attendance. In other words, classrooms with fewer students are more likely to have higher class average achievement scores (Tables 18, 29, 30, 41, 42, 43).

- Twenty nine of the thirty top performing classrooms for which two years of data are available are SAGE classrooms (p. 61).

Reduced Class Size and Life in SAGE Classrooms

Data collected from case studies conducted in three selected SAGE schools during 1998-99, from Teacher Questionnaires administered to all SAGE teachers, and from Principal Questionnaires completed by all SAGE principals confirm, clarify, and extend SAGE results from 1996-97 and 1997-98 regarding classroom events. The major findings related to teaching a reduced size class are the following:

- Individualization dominates SAGE classroom life.
- Individualization is made possible because having fewer students enables teachers to know students better, it reduces the need for discipline which results in more time for instruction, and it increases teacher enthusiasm for teaching.
- The individualization that occurs is process individualization rather than substance individualization. Teachers vary their instruction for individuals, but the curriculum is the same for all students.
- The effect of individualization is increased articulation and critique. In the reduced size class students more frequently reveal their present understandings and teachers more frequently correct misunderstandings.
- The main type of instruction is teacher centered (e.g., students listen, answer, practice, etc.) rather than student centered (e.g., problem solving, creative projects, etc.), but the use of hands-on activities is growing in frequency.
- A product of individualization in reduced size classes in addition to academic development is student

independence, thinking, and responsibility.

Other SAGE Interventions

- The reading-language arts and mathematics curricula at all three grade levels are in compliance with national standards. The compliance, however, is slightly greater in reading-language arts than in mathematics.
- Each SAGE school has an established staff development program that produces changes in classroom practices. The professional development program is mostly or completely implemented in over 75% of the schools.
- Lighted schoolhouse activities are present in each SAGE school.

Limitations

When considering the results of the 1998-99 SAGE evaluation several factors should be kept in mind:

- The number of schools in the Comparison group pool was reduced from 17 in 1996-97 to 14 in 1997-98; one school converted from a Comparison school to a SAGE school, while two additional schools withdrew for other reasons. This problem was addressed for the 1998-99 academic year with the addition of three new Comparison schools. As a result, the composition of the Comparison group has become less demographically similar from the SAGE group.

- Third grade results may have been influenced by two factors. First, in 1996-97 a considerable number of SAGE first graders achieved perfect scores on the spring post-test. This had the potential effect of placing a "ceiling" on the gains reported for SAGE first grade students. Secondly, what was a "ceiling" in 1996-97 became a "floor" for the scores of this group of SAGE students in second grade. It is not possible to know to what extent this phenomenon had an impact on the 1998-99 SAGE third grade achievement results.

- The longitudinal results reported are based on regression equations using individual level data. Since SAGE students do not move from grade to grade as part of an intact cohort it was not possible to use HLM analyses to compare the performance of SAGE 1998-99 classrooms to that of SAGE classrooms preceding years.

Future SAGE Evaluation Reports

- Smaller classes in the SAGE program have a significant effect on student achievement in the first grade. The data from the 1996-97, 1997-98 and 1998-99 evaluations indicate that this finding is robust. The problems created by using the CTBS Complete Battery, Terra Nova edition, Level 10 as a first grade post-test during the 1996-97 school year made interpretation of the achievement results of that cohort of SAGE first grade students problematic as they moved through second and third grade. Much clearer results should emerge as the SAGE 1997-98 and 1998-99 first grade cohorts move through the grades.

- The impact on class achievement results of non-SAGE students entering second and third grade for the first time will be considered.

- Student achievement is consistently higher in some SAGE classrooms are more effective in increasing student achievement than others. An examination of the most successful SAGE classrooms will be conducted to determine instructional and other factors related to achievement.

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1998-99 RESULTS OF THE STUDENT ACHIEVEMENT GUARANTEE IN EDUCATION (SAGE) PROGRAM EVALUATION

DECEMBER 1999

EXECUTIVE SUMMARY

Submitted by the SAGE Evaluation Team

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This document is available on the SAGE Website:

http://www.uwm.edu/SOE/centers&projects/sage/

EXECUTIVE SUMMARY

1998-99 Results of the Student Achievement Guarantee in Education Program Evaluation

December 1999

Introduction

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